

Chemical Age

Forth Styrene Plant at B.P. Llandarcy Site

(page 859)

ESSO RESEARCH LIMITED VOL. 84 No. 2158

28 DEC 1960

19 November 1960

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THE WEEKLY NEWSPAPER OF THE CHEMICAL INDUSTRY

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Tender meat in the Tropics

Primitive tribes in tropical America have for centuries used the leaves of the Papaya tree to make tough meat tender. The plant's milky fluid contains papain, a digestive enzyme resembling animal pepsin, and by wrapping the bruised leaves round their meat the natives are employing a natural catalyst to ingenious advantage.

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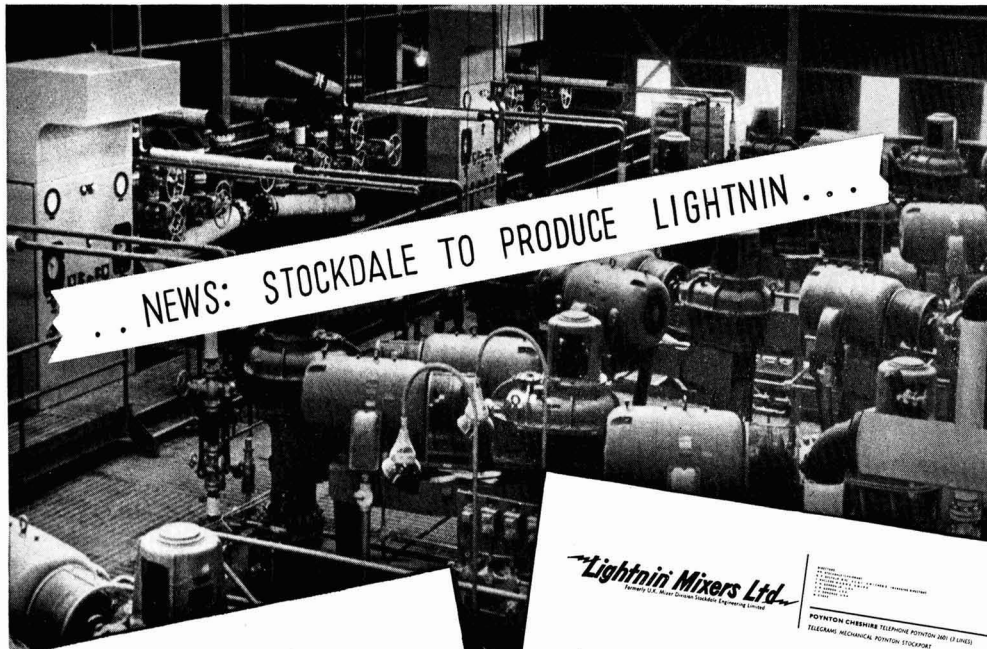


CHEMICAL ENGINEERING

NEWS

POYNTON CHESHIRE

No. 16



.. NEWS: STOCKDALE TO PRODUCE LIGHTNIN ...

STOCKDALE ENGINEERING LIMITED
CHEMICAL ENGINEERS

POYNTON CHESHIRE TELEPHONE POYNTON (240) (1 LINE)
TELEGRAMS MECHANICAL POYNTON STOCKPORT

IMPORTANT ANNOUNCEMENT

This is to advise that as from 30th September, 1960, the interests of our Fluid Mixer Division only will be handled by our new subsidiary, LIGHTNIN MIXERS LIMITED.

From this date, all outstanding orders and enquiries for mixers will be handled by the new company. 'STOCKDALE' filters, valves, etc., will continue to be handled by the parent company.

Wm Stockdale
Chairman

Lightnin Mixers Ltd.
Formerly U.K. Fluid Mixer Division Engineering Limited

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To all customers

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Managing Director

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POYNTON, CHESHIRE. Tel. Poynton 2601.

Name

Company

Address.....

Position.....G 17

INDEX TO ADVERTISERS

The first figures refer to advertisements in Chemical Age Directory & Who's Who, the second to the current issue

Page	Page	Page	Page	Page	
139	—	Mirrlees Watson Co. Ltd., The	—	126	
I.C.I. (Billingham)	—	Mirvale Chemical Co., Ltd., The	—	Saunders Valve Co. Ltd.	848
I.C.I. Catalysts	Front Cover	Mitchell, L. A., Ltd.	—	Scientific Design Co. Inc.	—
I.C.I. General Chemicals Division	—	Mitchell Cotts Co. Ltd.	157	164	
I.C.I. Ltd. Heavy Organic Chemicals	843	Mond Nickel Co. Ltd., The	108	Scottish Tar Distillers Ltd.	—
I.C.I. Metals Titanium D.	—	Monkton Motors Ltd.	115	Sharples Centrifuges Ltd.	—
I.C.I. Plastics—Darvic	—	Monsanto Chemicals Ltd.	—	3	
I.C.I. Plastics—Fluon	—	Morgan Refractories Ltd.	—	Sheepbridge Equipment Ltd.	—
I.C.I. Ltd. (Plastics Division), Corvic	—	Moritz Chemical Engineering Co. Ltd.	—	Shell Chemical Co. Ltd.	847
I.C.I. (Florube) Ltd.	—	National Coal Board	—	Shell-Mex & B.P. Ltd.	—
168	—	National Industrial Fuel Efficiency Service	—	Shell Industrial Oils	—
Infra Red Development Co. Ltd., The	—	Neckar Water Softener Co. Ltd.	848	Siebe, Gorman & Co. Ltd.	—
173	—	137	—	Sifam Electrical Instrument Co. Ltd.	—
International Furnace Equipment Co. Ltd., The	—	Negretti & Zambra Ltd.	—	34	
Interscience Publishers Ltd.	—	Newnes, George, Ltd.	—	Simon, Richard, & Sons Ltd.	844
Isopad Ltd.	—	Nitrate Corporation of Chile Ltd.	—	Smith, Leonard (Engineers) Ltd.	—
142	—	Nordac Ltd.	—	Sipon Products Ltd.	—
Jackson, J. G., & Crockett Ltd.	—	Normalair Ltd.	—	Sojuzchimexport	—
167	—	Northgate Traders (City) Ltd.	854	250	
Jenkins, Robert, & Co. Ltd.	—	Nuovo Pignone	841	Southern Instruments Ltd.	—
Johnson, Matthey & Co. Ltd.	—	Nu-Swift Ltd.	—	Spence, Peter, & Sons Ltd.	—
Johnsons of Hendon Ltd.	—	150	—	187	
Jones & Stevens Ltd.	—	Odoni, Alfred A., & Co. Ltd.	—	Spencer Chapman & Messel Ltd.	—
159	—	G/Card Oil & Colour Chemists' Association	—	Standard Chemical Co.	—
K. D.G. Instruments Ltd.	852	144	—	Stanfield & Carver	—
K & K Laboratories Inc.	—	Optical-Mechanical (Instruments) Ltd.	—	302	
K.W. Chemicals Ltd.	—	Orthos (Engineering) Ltd.	—	Stanton Instruments Ltd.	—
Kaylene (Chemicals) Ltd.	—	G/Card P.G. Engineering Ltd.	—	Staveley Iron & Chemical Co. Ltd.	—
158	—	Palfray, William, Ltd.	—	Steel Drums Ltd.	—
Kellie, Robert, & Sons Ltd.	—	8	—	118	
Kellogg International Corporation	—	Peabody Ltd.	—	Steele, J. M., & Co. Ltd.	—
136	—	Penrhyn Quarries Ltd.	—	Stockdale Engineering Co. Ltd.	839
Kernick & Son Ltd.	—	201 & 265	—	Sturge, John & E., Ltd.	—
301	—	G/Card Petrocarbon Developments Ltd., The	—	Surface Protection Ltd.	—
Kestner Evaporator & Engineering Co. Ltd.	—	Plastic Constructions Ltd.	Cover ii	Sutcliffe Speakman & Co. Ltd.	—
Kestner Evaporator & Engineering Co. Ltd. (Keebush)	—	213	—	140	
Kestner (Industrial Safety) Ltd.	854	Plastic Filters Ltd.	—	Synthite Ltd.	—
116	—	163	—	134	
Kleen-e-ze Brush Co. Ltd., The	—	Platon, G. A., Ltd.	—	"T.P." Chemical Engineering Co. Ltd.	—
184	—	Podmores (Engineers) Ltd.	—	169	
Laboratory Apparatus & Glass Blowing Co.	—	238	—	Taylor Rustless Fittings Co. Ltd., The	—
Laboratory & Electrical Engineering Ltd.	—	Polysius Ltd.	—	Taylor Stainless Metals Ltd.	—
Langley Alloys Ltd.	—	246	—	223	
112	—	Pool, J. & F., Ltd.	—	Tempair Ltd.	—
Lankro Chemicals Ltd.	—	Pott, Cassels & Williamson Ltd.	—	148	
203	—	Potter, F. W., & Soar Ltd.	—	Thermal Syndicate Ltd., The	—
Laporte Chemicals Ltd.	—	236	—	174	
122	—	Powell Duffryn Carbon Products Ltd.	856	Titanium Metal & Alloys Ltd.	—
Leek Chemicals Ltd.	—	Power-Gas Corporation Ltd.	—	141	
118	—	Prat-Daniel (Stannore) Ltd.	—	Towers, J. W., & Co. Ltd.	—
Leigh & Sons Metal Works Ltd.	840	Premier Colloid Mills Ltd.	—	241 & 256	
Lennig, Charles & Co. (Great Britain) Ltd.	—	123	—	Tylors of London Ltd.	—
Lennox Foundry Co. Ltd.	—	152	—	Uhde, Friedrich, GmbH.	—
142	—	Price Stuffield & Co. Ltd.	—	176	
Light, L., & Co. Ltd.	—	Prodorite Ltd.	—	Unicone Co. Ltd., The	—
111	—	Price's (Bromborough) Ltd.	—	188	
Liquid, Peter, & Co. Ltd.	—	Pyrene Co. Ltd.	—	Unifloc Ltd.	—
126	—	Pyrene-Panorama Ltd.	—	Unilever Ltd.	—
Liquid Solid Separations Ltd.	—	156	—	Union Carbide Ltd.	—
Lloyd & Ross Ltd.	846	Pyrometric Equipment Co. Ltd., The	—	Unit Superheater & Pipe Co. Ltd., The	—
176	—	Q.V.F. Ltd.	—	172	
London Sand Blast Decorative Glass Works Ltd., The	—	Quickfit & Quartz Ltd.	—	United Filters & Engineering Ltd. The G/Card	
144	—	142	—	Universal-Matthey Products Ltd.	—
Longman Green & Co. Ltd.	—	226	—	176	
Longworth Scientific Instruments Co.	—	Reavell & Co. Ltd.	—	W.E.X. Traders Ltd.	—
163	—	Redweld Ltd.	—	177	
Lord, John L., & Son	—	Resinform Ltd.	—	Walker, P. M., & Co. (Halifax) Ltd.	—
Loughborough Glass Co. Ltd.	—	Rheem Lysaght Ltd.	—	179	
Lurgi Verwaltung GmbH.	—	Rhodes, B., & Son Ltd.	—	Waller, George, & Son Ltd.	Cover iii
150	—	Richardson Scale Co. Ltd.	—	Ward, Thomas W., Ltd.	—
McCarthy, T. W., & Sons	—	Richmond Welding Co. Ltd.	—	Warren-Morrison Ltd.	—
MacLellan, George, & Co. Ltd.	—	Rose, Downs & Thompson Ltd.	—	136	
McMurray, F. J.	—	228	—	Watson, Laidlow, & Co. Ltd.	—
175	—	Rosin Engineering Co. Ltd.	—	Watson-Marlow Air Pump Co.	—
Maine, B. Newton, Ltd.	—	180	—	Wellington Tube Works Ltd.	—
116	—	154	—	225	
Manesty Machines Ltd.	—	Saint-Gobain	—	Whitaker, B., & Sons Ltd.	Cover ii
199	—	—	—	Widnes Foundry & Engineering Co. Ltd.	—
Marchon Products Ltd.	—	—	—	244	
Marston Excelsior Ltd	—	—	—	Wilcox, W. H., & Co. Ltd.	—
May & Baker Ltd.	—	—	—	160	
152	—	—	—	Wilkinson, James, & Son Ltd.	845
Metacalf & Co.	—	—	—	130	
Metering Pumps Ltd.	—	—	—	Williams & James (Engineers) Ltd.	—
Metropolitan-Vickers Electrical Co. Ltd.	—	—	—	Witco Chemical Co. Ltd.	—
120	—	—	—	Wood, E., Ltd.	—
Middleton & Co. Ltd.	—	—	—	130	
Mineralöle Import und Export GmbH	—	—	—	Wood, Harold, & Sons Ltd.	—
—	—	—	—	172	
—	—	—	—	Worcester Royal Porcelain Co. Ltd., The	—
—	—	—	—	Wynn (Valves) Ltd.	—
—	—	—	—	138	
—	—	—	—	Yorkshire Tar Distillers Ltd.	—
—	—	—	—	Young, A. S., & Co.	—
—	—	—	—	138	
—	—	—	—	Zeal, G. H., Ltd.	—

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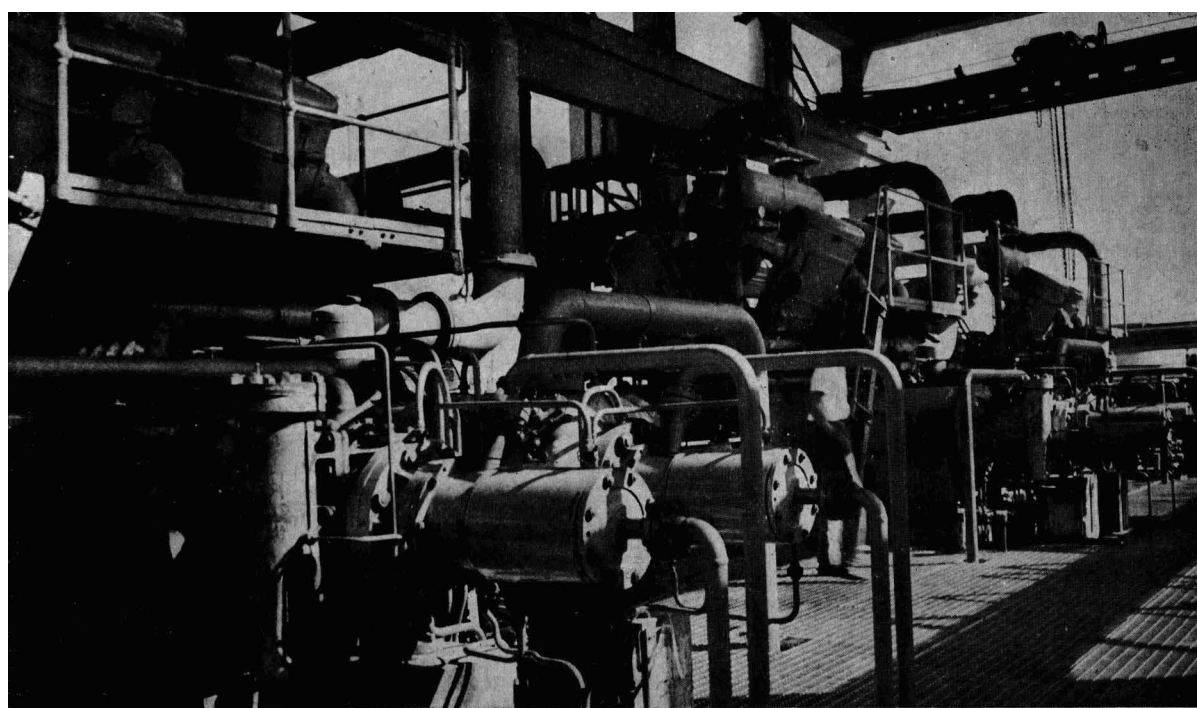
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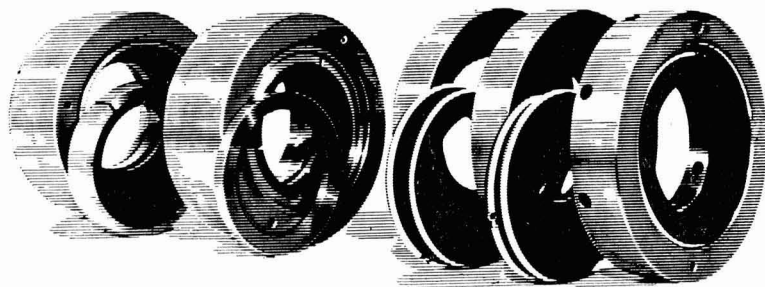


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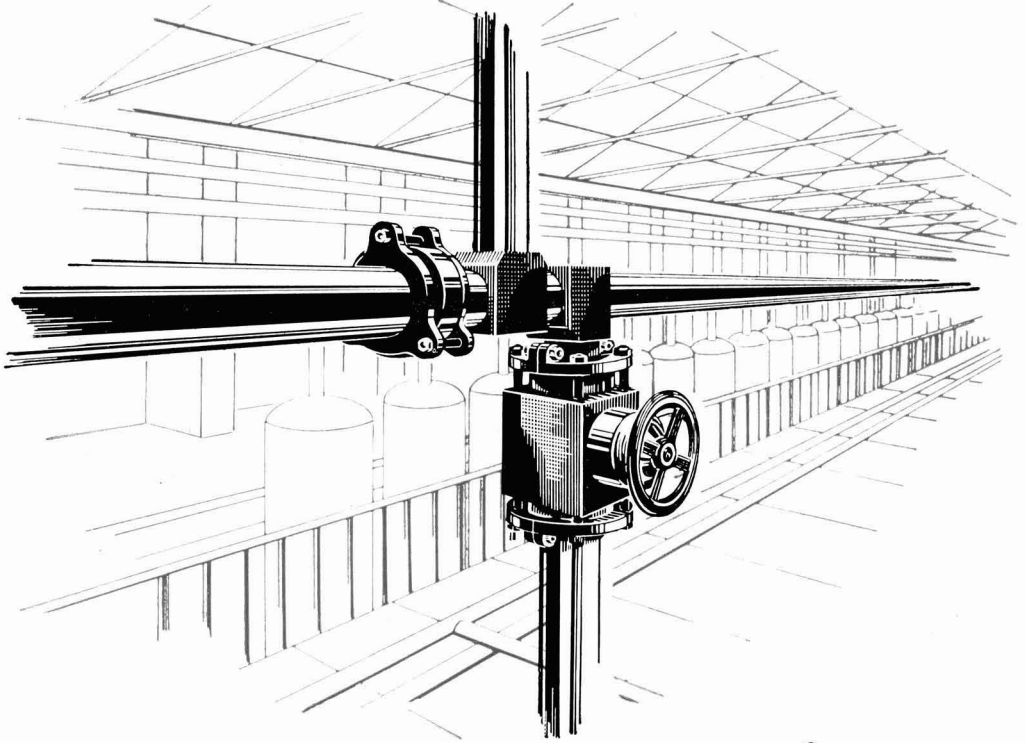
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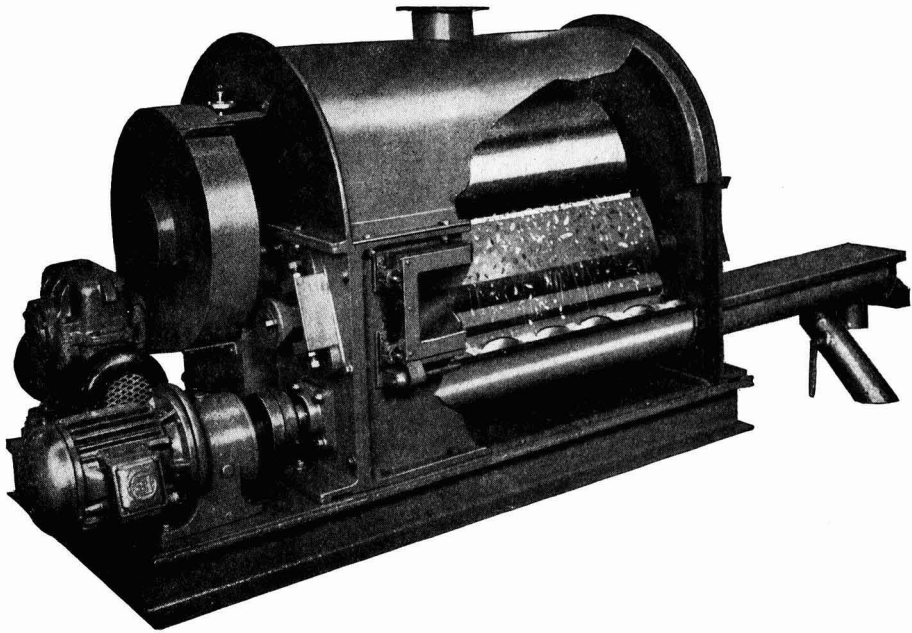
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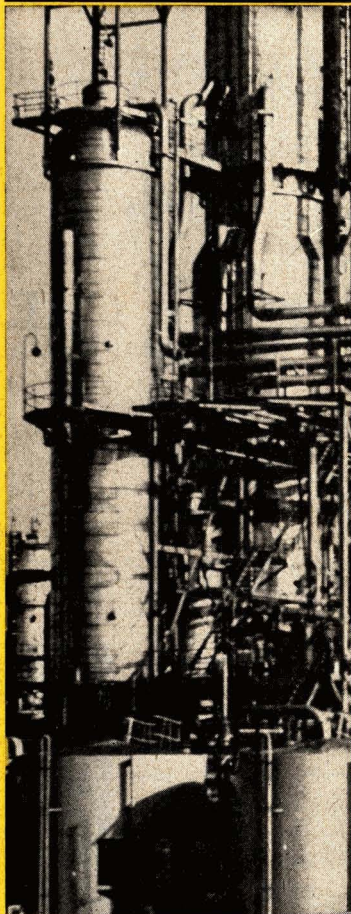
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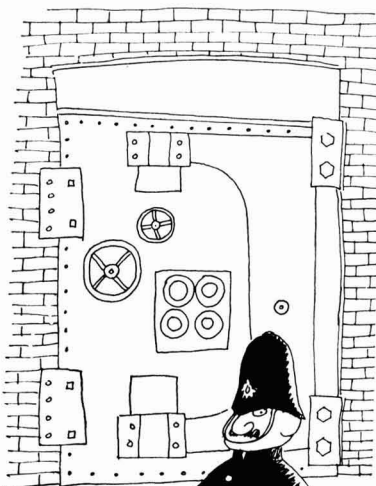


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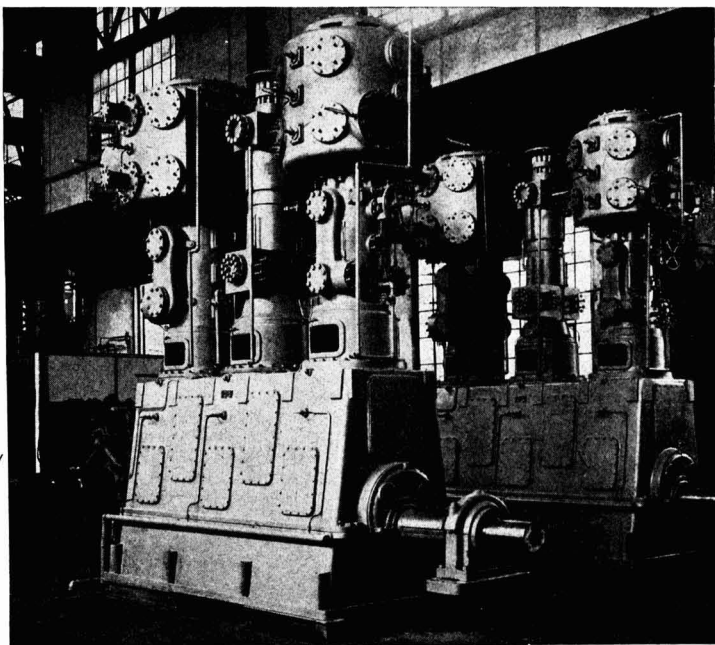
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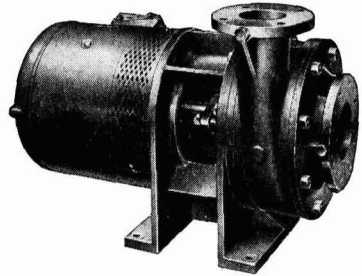
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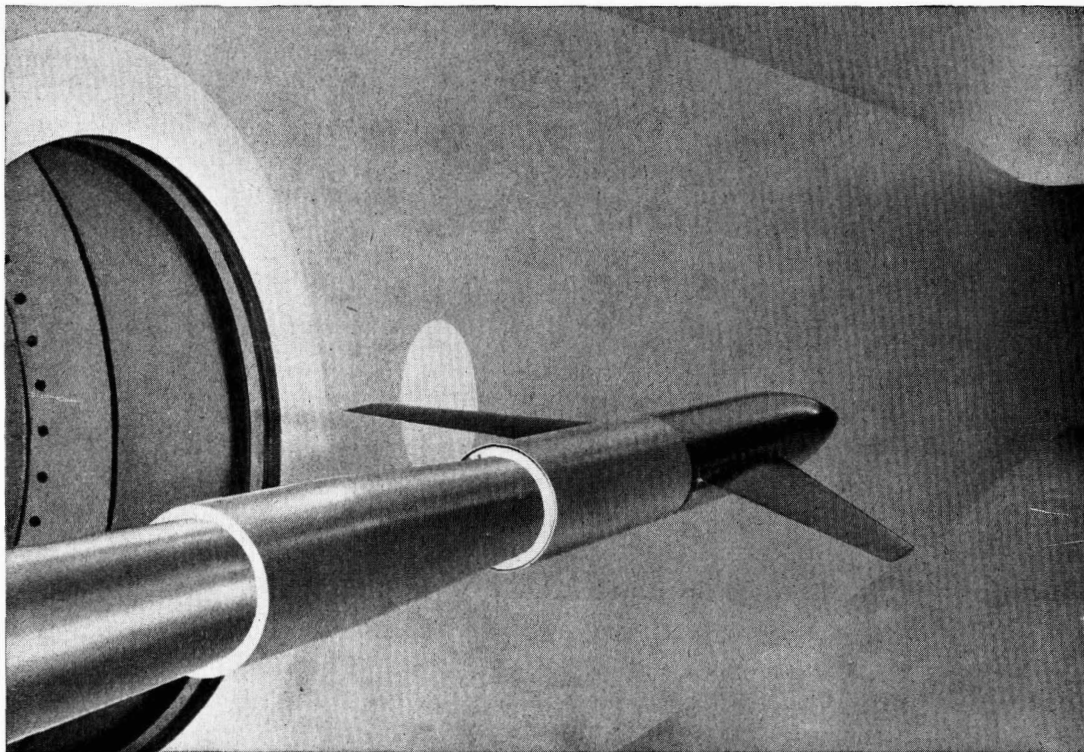
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- ★ as protective coatings for metal, wood and ceramic surfaces
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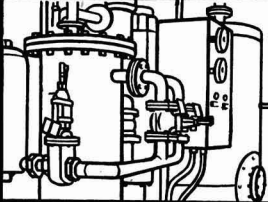
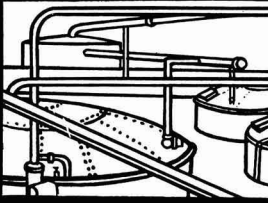
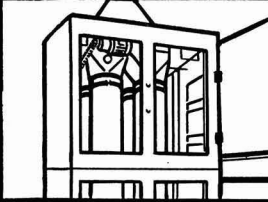
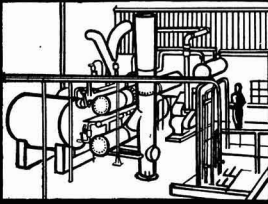
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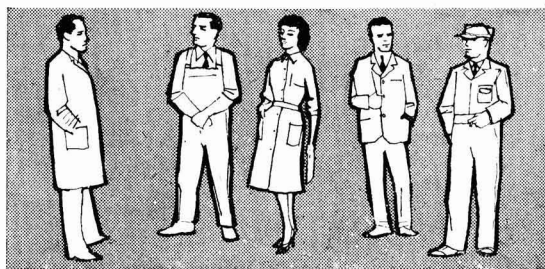
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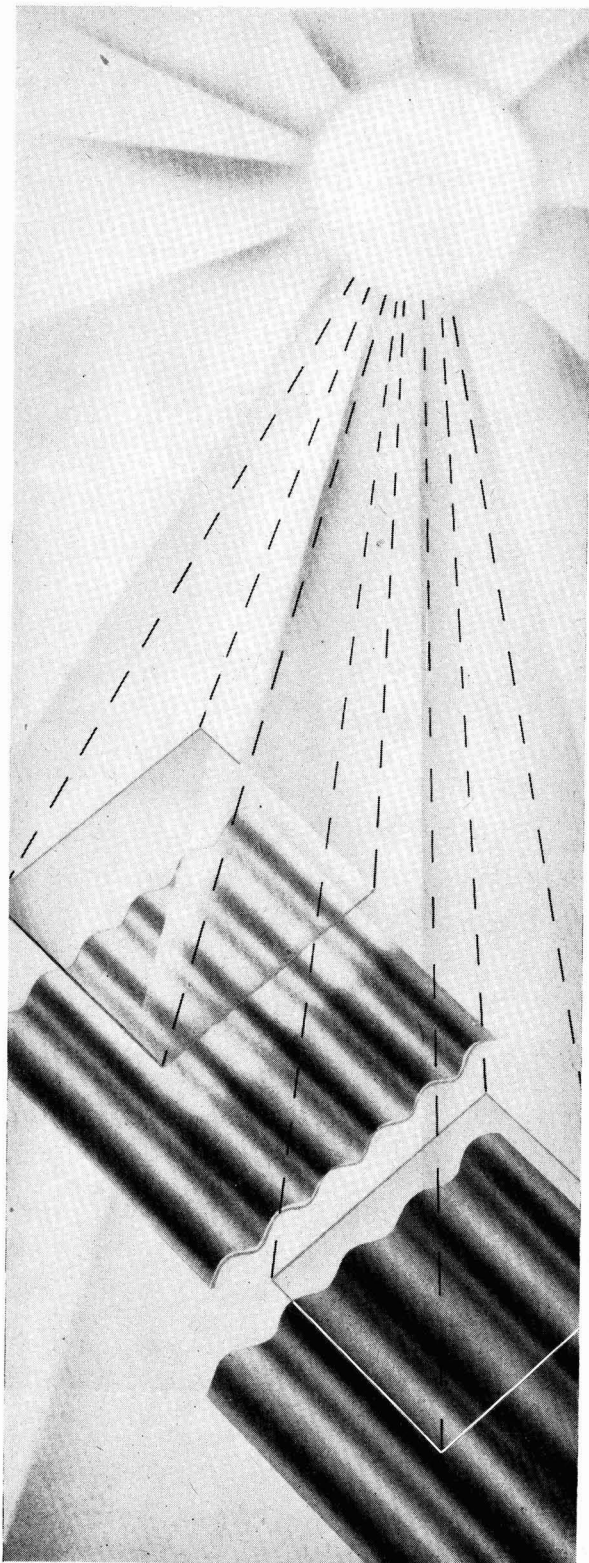
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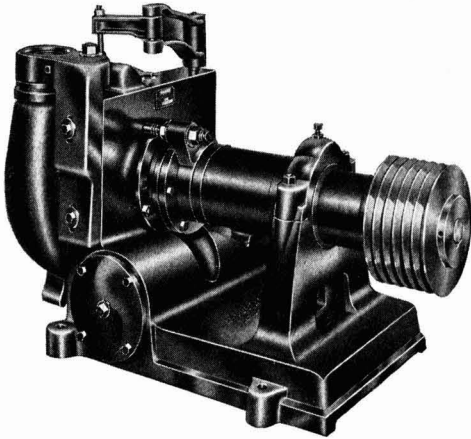
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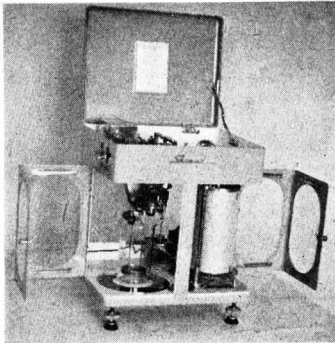
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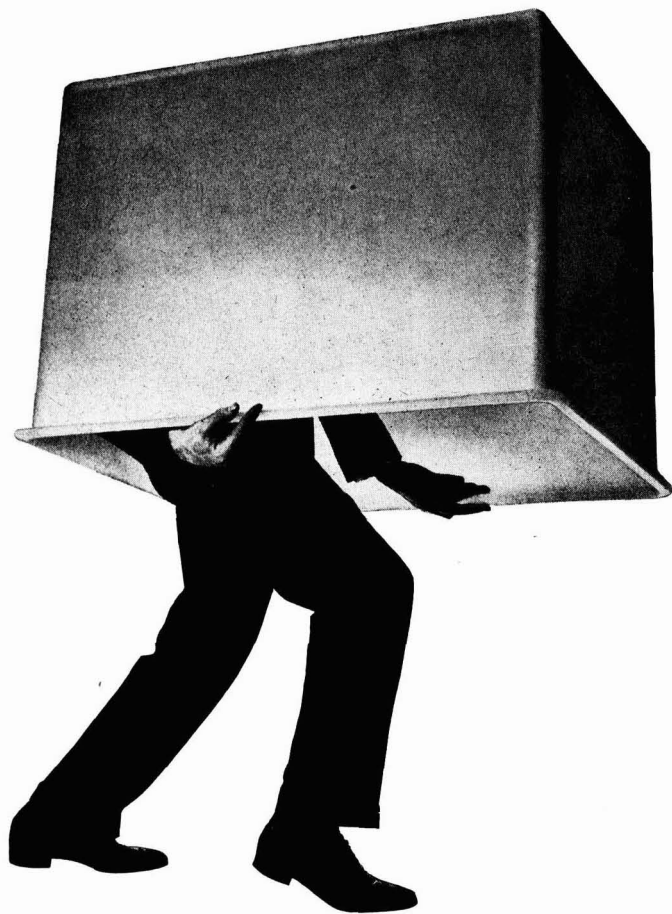
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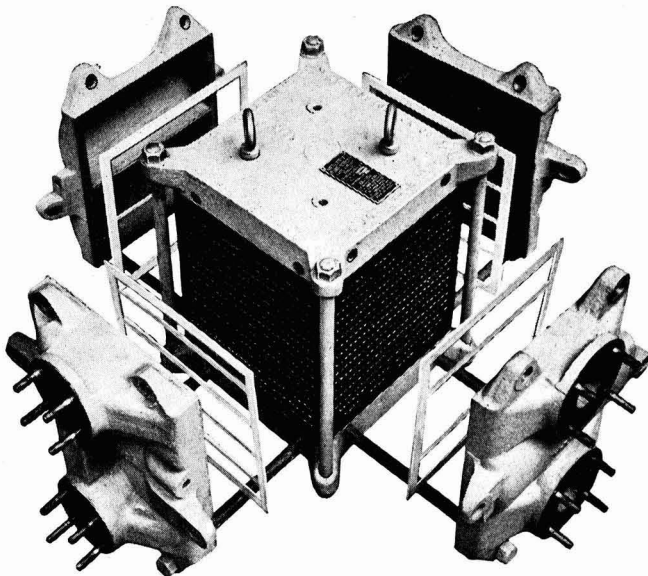
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Distillates	858
Project News: Forth Styrene; I.C.I. Terylene and polypropylene; Port Talbot benzene, etc.	859
Swiss Chemicals and Free Trade	861
Borax Bid for Hardman	862
Indian Chemical Projects	863
New Fire Research Labs.	864
Overseas News: Allied Buy Snia Viscosa Caprolactam R'ights	865
Bookshelf	867
Scientific Russian	869
Glaxo Penicillin Production	870
Effluent Treatment Process Tested	870
D.C.L. Form Overseas Division	870
People in the News	871
Commercial News	872
Market Reports	872
Trade Notes	873
New Patents	874
Diary Dates	874

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CHEMICAL AGE

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CHEMICALS FROM BENZOLE

THE increasing demand for benzole products as raw materials for the chemical industry is well illustrated by a rise in production from 34.1 million gall. in 1958 to 41.2 million in 1959, while total production of motor benzole from coke ovens, gasworks and tar distilleries dropped from 42.8 million gall. in 1958 to 29.6 million gall. in 1959. As is pointed out in the latest 'Review of Benzole Technology' (on p. 144), published by the National Benzole and Allied Products Association, 1959 was the first year in which production of pure benzole exceeded that of motor benzole.

The benzole refiners are, in fact, hard put to it to meet the present considerable demand for pure benzene and xylenes, especially as the call is for constantly higher quality and purity. It is doubtful whether the acid washing techniques on which the benzole industry is at present largely dependent can continue to meet these requirements, whatever new modifications may be introduced. Hence the interest in the newer methods, such as hydrogenation. As reported on page 860, the Lurgi benzole hydro-refining plant of the Port Talbot Chemical Co. has given very encouraging results since its start-up a few weeks ago, and it can confidently be expected that although this is the first plant of this type in the U.K. to produce pure benzene by hydrorefining, it will not be the last. Other benzole refining innovations that are becoming increasingly evident include the newer methods of benzole defronting, such as the Holmes/Taylor column and the A.P.V. continuous defronting unit. The latter, already well established in operation at the Scunthorpe works of the Appleby-Frodingham Steel Co. and at the nearby works of the Lincolnshire Chemical Co., has now been chosen for the new British Celanese project at Spondon for producing nitration grades of benzene and toluene and 3° xylene.

The last-mentioned project can also be seen as a move away from the present pattern of benzole processing, in line with British Petroleum's intention of producing benzene at the Isle of Grain. The big question mark is how much benzene is likely to be produced from petroleum sources in the future. Interest is almost certain to increase in view of the mounting U.K. production of styrene; in the U.S. styrene took 42% of the 330 million U.S.gall. of benzene produced in 1959.

Apart from the economic questions involved, much depends on the action taken by the conventional benzole refining industry, now, to meet the new emphasis on chemical grades of benzole and its by-products. The metallurgical coke-oven operators (and now British Celanese) have so far taken the initiative in experimenting with the newer processes; the National Coal Board, who have much to gain by exploring new coal utilisation possibilities, has not exploited the chemical by-products field. Indeed, the suggestion has been made, in a policy statement issued by the Association of Scientific Workers ('A National Fuel and Power Policy', 1s) that a National Coal Chemical Board is needed to purchase the liquid products of carbonisation and to build its own chemical industry.

Whether or not some such suggestion is eventually adopted it is plain that some closer co-ordination of tar distilling and benzole refining activities will be necessary as well as a more intensive investigation into economical methods of producing coal chemicals.



★ ONE of the most interesting growth chemicals is surely styrene monomer. Plans of Forth Chemicals to make 50,000 tons/year at Llandarcy (see p. 859) will raise their capacity in two years to 100,000 tons/year. Only other U.K. producers are Shell who have a capacity of 18,000 tons/year.

It is in the polystyrene field—copolymers and foam—that big use expansions are looked for. Both Shell and Monsanto Chemicals—the latter holding two-thirds of Forth and having recently bought up Flamingo Foam—have big stakes in the foam field. The current major outlet is in sheet for cold storage insulation and this is expected to grow considerably; secondly, major expansion is looked for in the building industry; thirdly, a new major use could well be in disposable drinking cartons.

Polystyrene copolymers are an interesting field with a high-growth potential. In the U.S., these copolymers account for 6% of the industrial pipe market and styrene generally accounts for some 40-50% of the product. I.C.I. have recently entered the field with their ter-polymer, Kralastic, comprising styrene, acrylonitrile and butadiene. Other copolymers of styrene, acrylonitrile and methymethacrylate or methylmethacrylate and butylmethacrylate are blended with nitrile rubber.

★ WHAT a paradoxical world this is! First we hear of attempts to convert wood to sugar for food manufacture; papers presented at a recent meeting of the F.A.O. in Tokyo included several on the present development of the wood hydrolysis industry throughout the world (CHEMICAL AGE, 1 October 1960, pp. 532, 540)—and now three British scientists have won international recognition for their attempts to find new uses for sugar as a raw material in industry.

At the University of Birmingham, Prof. M. Stacey, is studying methods of improving new types of detergents based on sugar. These sugar-based detergents are a recent development and although they are not being produced commercially, pilot plant scale production is being carried out in several countries. Prof. Stacey's object is to create new and more useful products.

Investigations into the industrial uses of sugar are also underway at the University of London at Royal Holloway College. Prof. E. J. Bourne is studying sequestering agents derived from mannitol and sorbitol, derivatives of sugar. Sequestering agents are widely used to inhibit the undesirable effects of metallic ions. For example, certain metallic ions contribute significantly to the development of rancidity.

Prof. Bourne is also dealing with certain aldehydes derived from sugar which show promise in the field of plastics, and Dr. L. Hough at the University of Bristol is preparing carbonate ester polymers of sugar by chemical means.

So perhaps not so paradoxical. Maybe the days are not so far away when we shall produce plastics from wood—we are used to getting them from coal and after all it only means going one stage further back for our raw material.

★ DOING business with the Soviet bloc calls for a different approach from usual, as Mr. A. Wormald, joint managing director of Fisons Ltd. pointed out in a special article in our issue of 29 October. To that I can now add the personal experiences of Mr. John S. Young, a director of Craig Pumps Ltd., Giffnock, Glasgow. Like Mr. Wormald, he found that it pays to bring products to the attention of the Soviet import authorities, both in London and Moscow.

Full particulars were supplied and following an enquiry, Mr. Young had initial discussions with Soviet officials in London. He then went to Moscow and made direct contact with the import authorities. This led to an extensive official contract for the supply of centrifugal chemical pump/motor sets complete with associated electrics.

Mr. Young tells me that he found Soviet officials very courteous and helpful. They were also determined to obtain equipment of modern design. Documentation and specification arrangements were clearly stated and contract arrangements have been handled "most efficiently." He is hopeful of further substantial export business with the U.S.S.R. and was told by them that the import authorities were able to place considerable business.

★ MANY well known titles in the fields of chemistry, mathematics, electronics and economics are among the first group of low-priced text books on scientific, engineering, and other technological subjects which are being produced and are available to students and others in India under the Government's programme to promote the flow of British books and periodicals to countries overseas. Among them are Kipping and Kipping's *Organic Chemistry*, Anderson's *Modern Aspects of Inorganic Chemistry*, and Finar's *Organic Chemistry*.

The books will be sold at roughly a third of their normal cost or even less in some cases. This list will be followed

by other university text books on these and other subjects.

In other countries, too, there are movements to promote British books and periodicals. The possibility of operating a similar scheme in Pakistan is expected to be discussed. An agreement with the Yugoslav Government has resulted in an encouraging increase in the amount of trade of this type. The text of an agreement with the Government of Israel provided for the imports of British books, periodicals and newspapers. Indonesia, too, is considering proposals of a similar nature.

★ MODESTY might have its own rewards, but I can't think of any so far as the farm chemical field is concerned. Here undue modesty on the part of producers has in the past left the correspondence columns of *The Times* wide open to the ill-informed critics of chemical sprays who so often sign themselves 'nature lover.'

Since the Association of British Manufacturers of Agricultural Chemicals has taken a hand in publicising the large-scale research expenditure of its members, letters on the subject appear to have become much better informed and more appreciative of the efforts that the industry has been making—*unsung*—for many years.

Now the current edition of *I.C.I. Magazine* contains an excellent article on how science aids the gamekeeper. As long ago as 1933 I.C.I. started a research project to find out more about the factors influencing stocks of game and ways of preventing their decline. In 1946 they opened research laboratories at Burgate Manor, Fordingbridge, and rented the shooting on 4,000 acres of nearby farmland.

Since then, a revolution in the techniques of rearing and preserving pheasants and partridges has taken place. And this is only one of many examples of the chemical industry's long record of practical assistance to its country cousins.

★ TWO members of the Battelle Memorial Institute in the U.S. have aimed a deadly dart at the idea of using computers, data-processing machinery and the like to cope with the world's mounting volume of scientific and technical literature. They feel that technical information should be dealt with in terms of how useful it is, not how much there is of it. I wonder how the American Chemical Society with its new computer-based index of world titles, will take this.

Instead of facing the researcher with an overwhelming list of references to books, papers, articles and reports, it is proposed that the literature received by an information centre should be continuously screened and evaluated by the scientists and research engineers who use it, and that the published information should be supplemented with data obtained from discussions, conferences, letters and visits.

Alembic

Expansion Mooted for I.C.I. Polypropylene Plant

● JUST starting its first reactions at Wilton, I.C.I.'s Propathene polypropylene plant is already under consideration for extension. An official party visited the plant on 10 November to mark its completion by **Constructors John Brown Ltd.**, main contractors. Modifications will be necessary for some time. This was stated recently by Mr. A. Burness, works manager at Wilton for I.C.I. **Plastics Division**.

Expansion Plans for Reichhold Subsidiaries

● A NEW works, complete with extensive offices and research and development laboratories, is to be built on a 100-acre site at Brockhampton, near Havant, Hants, for **Vinyl Products Ltd.** and **Vinatex Ltd.** (members of the Reichhold Chemicals Ltd. group), who will be moving in two or three years' time from the site they share at Carshalton, Surrey. Lack of space at Carshalton for the two companies' expansion projects has already been underlined by the completion of a new factory for Vinatex, shortly to come into production, at New Lane, Havant.

Vinyl Products manufacture emulsions and solutions of a range of synthetic resins while Vinatex produce p.v.c. compounds, pastes and sintering powders.

£120,000 Export Orders for Stainless Steel Tubing

● Two orders from Czechoslovakia and Finland for welded stainless steel tubing for use in chemical plants, totalling more than £120,000, have been obtained by **Rollo-Hardy and Co.** (Blaenrhondda, Glamorgan), a member of the Compo-flex group. The orders cover tubing of from 25 to 27 mm. o.d. Rollo-Hardy, who specialise in the production of welded mild and stainless steel tubes and sections, at present export about 40% of their annual output, but the Czechoslovakian order is the first they have had from the Soviet bloc.

Coke-oven Quenching Tower Plan Approved

● **ESTON** (Yorks) Urban Council has approved plans for a quenching tower at proposed new coke-ovens to be built at South Bank-on-Tees, for the **South Durham Steel and Iron Co. Ltd.** Councillor J. E. Green, said it was outrageous that the proposed ovens were to be built on a site only 80 yards from houses, but Councillor Herlinslaw, chairman of the Council, said that although the Council had opposed the scheme, a public inquiry had been held, and the project had received Ministry sanction. Councillor Ginty said that although the Council had lost the public inquiry, their objections had had some effect. A new type of door had been designed for the plant, and a committee was reporting on coke-oven pollution.

Project News

Forth to Raise Styrene Monomer Output to 100,000 T.P.A.

MORE plans to develop petrochemical facilities at B.P.'s Llandarcy refinery have been revealed with the news that Forth Chemicals Ltd. are to erect a 50,000 tons/year styrene monomer plant there. This follows the news that **British Hydrocarbon Chemicals Ltd.** have plans for an initial investment at Llandarcy of £10 million (C.A., 8 October, p. 575).

B.H.C., who have already invested some £30 million at the B.P. Grangemouth refinery, are jointly owned by **British Petroleum** and the **Distillers Company**. B.H.C. own two-thirds of **Forth Chemicals**, the other third being held by **Monsanto Chemicals Ltd.**

The new Forth plant will cost more than £3 million and will be built between Neath and Port Talbot, South Wales, adjacent to the B.H.C. site near the Llandarcy refinery. Design and engineering for the new styrene unit will be carried out by **Monsanto** and the plant is expected to take about two years to come into operation.

Forth, with their Grangemouth styrene monomer facilities, are the largest U.K. producer of styrene monomer. Built in 1953, the Scottish plant has been twice expanded and a third expansion now nearing completion will raise Grangemouth production to 50,000 tons/year; completion of the Welsh plant in 1963 will therefore raise Forth's total capacity for styrene to 100,000 tons/year. The only other U.K. styrene monomer producers, **Shell Chemical**, recently came on stream with a 18,000 tons/year plant at Carrington.

When the B.H.C. Llandarcy investment was announced, no details were

available of the chemicals to be produced there. It is now stated that ethylene for the new Forth styrene unit will come from B.H.C.; it is obvious, therefore, that ethylene figures in the production plans of B.H.C. at their new site. (Grangemouth olefin production totals some 130,000 tons/year.)

Benzene for the Forth styrene plant will, it is stated, be obtained from outside sources. **British Petroleum Co. Ltd.** plan to have 16,000 tons a year of ethyl benzene available—along with *o*-xylene and *p*-xylene—at their Isle of Grain refinery by late 1961. As stated in C.A., 15 October, p. 623, production there will be in co-operation with the **California Standard subsidiary**, **California Chemical Co.** High-purity benzene is also available from the nearby **Port Talbot Chemical Co. Ltd.**, a subsidiary of the **Lincolnshire Chemical Co. Ltd.** and the **Steel Company of Wales**.

Chairman of **Forth Chemicals** this year is **Sir Miles Thomas**, **Monsanto** chairman. **Sir Miles** is also chairman of the **Development Corporation for Wales** and in this capacity he has expressed the great satisfaction that the people of Wales will feel at this latest addition to their growing and increasingly diversified economy.

I.C.I. Plan Terylene Polyester Fibre Plant at Kilroot, Northern Ireland

UNITS to produce Terylene and possibly other man-made fibres will be built at Kilroot, near Carrickfergus, County Antrim, Northern Ireland, by **Imperial Chemical Industries Ltd.**, who have bought some 200 acres of land for this purpose. It is possible that polypropylene fibre, initial manufacture of which is being undertaken at Wilton, will also be manufactured at Kilroot in due course; it will be recalled that in August I.C.I. acquired from **Montecatini of Milan**, exclusive rights for the production and sale in the U.K. of staple fibres, filament yarns and textile monofilaments from polypropylene.

Terylene is manufactured at Wilton at present and extensions to the plant, now under construction, are due to come into full operation in 1962. Two years ago I.C.I. announced their intention of locating Terylene spinning plants in Northern Ireland as and when the developments of the market for Terylene made those necessary.

Site development at Kilroot will begin early in 1961 with a view to starting production in 1963. When full production has been achieved, a labour force of about 1,150 will be required and, if the project succeeds in accordance with expectations, it is hoped to expand the plant to give eventual employment to at least 2,000. During the construction period it is expected that the company's contractors will require a labour force rising to some 600-800 men in 1962/63.

... And a B.P. Refinery for N. Ireland, Too

● NOT far from I.C.I.'s projected Terylene factory—on a 100-acre site on the other side of Belfast Lough, between Belfast and Holywood, Co. Down, the **British Petroleum Co. Ltd.** propose to build an 18 m. oil refinery with a capacity of 1.3 m. tons of crude oil a year

to produce petrol, kerosene, aviation turbine fuels, light and heavy diesel oils, fuel oil and liquefied petroleum gas. To supply the Northern Ireland market of Shell Mex and B.P. in addition to its export trade, the refinery is being designed to handle Middle East crude

which will be brought in tankers of up to 32,000 tons deadweight.

Work on the refinery will begin early next year and it will probably be completed in two years. The project also involves the construction of a £500,000 jetty.

Port Talbot High-purity Benzene Plant on Stream

BELIEVED to be the first of its kind in the U.K. to produce pure benzene by hydrorefining, the new benzole refinery of the **Port Talbot Chemical Co. Ltd.** has now been in production since early October and initial production indicates that the qualities of the products are well up to those anticipated. Already a pure benzene of over 5.40 crystallising point, and a sulphur content of below 5 p.p.m., has been obtained.

The company is controlled by the Steel Company of Wales Ltd. and the Lincolnshire Chemical Co. Ltd. and the new benzole refinery at Port Talbot obtains its crude benzole and coke oven gas (which provides the source of hydrogen) from the coke ovens of the Steel Company of Wales. The refinery started production ahead of schedule—less than

12 months after the order for the plant was placed (see *CHEMICAL AGE*, 21 November 1959, p. 731).

With an initial design capacity of 4.5 million gall. of crude benzole a year, the plant was designed by Lurgi of Frankfurt, Germany, and erected by Simon-Carves, while the distillation equipment was supplied by R. and J. Dempster Ltd. in conjunction with Lurgi and the Port Talbot Chemical Co. Consulting engineers were Cremer and Warner Ltd., London S.W.1.

A hydrorefining plant to produce mainly low-sulphur motor benzole and a new range of tar solvents was brought into operation at the Cadishead works of Lancashire Tar Distillers last year (see *CHEMICAL AGE*, 4 July 1959, p. 13).

Gasholder, C.W.G. Plant Contracts for P.G.

TWO Wiggins dry seal type gas-holders, the largest of their type in the U.K., are among recent orders obtained by **P.G. Engineering Ltd.**, Stockton. The value of these orders, which are for gas storage and gasmaking plant, is over £250,000. Each of these gasholders will have a capacity of 1 million cu. ft.; one is for the storage of coke oven gas for Colvilles Ltd., and the other for the Wales Gas Board at Rhondda to store town gas.

Also for the Wales Gas Board, the company have recently received a contract for a carburetted water gas plant with a capacity of 3 million cu. ft./day, to be installed at the Maelor works, Wrexham. This plant incorporates a mechanical operator with boiler jacket, cyclic coke feed and the reverse flow carburetting system. An electrically

operated hydraulic system is incorporated for the cyclic control of the plant valves. The plant also incorporates equipment to permit the use of PFD and liquid butane for reforming and enriching in addition to gas oil. The installation is expected to be complete and ready for operation in November 1961.

Catholic Protection Contract for U.K. Company

● **C**ONTRACT for pipe coating inspection services and catholic protection of the 720-mile crude oil line from Nahorkatiya to Barauni in North India has been placed by Burmah Oil (Pipe Lines) for Oil India with **Catholic Corrosion Control Ltd.**, in association with Indian Catholic Protection Co. Private, Bombay.

Kestner Evaporators for Ebbw Vale Steelworks

● **T**WO evaporators for concentrating an acid electrolyte liquor, recently ordered from the **Kestner Evaporator and Engineering Co. Ltd.**, will form part of a complete installation, for the continuous production of tinned steel strip at the Ebbw Vale Works of Richard Thomas and Baldwins Ltd. The installation was ordered from and engineered by the Head Wrightson Machine Co. Ltd., of Middlesbrough, who, hitherto, have used evaporators of American design for this application. The evaporators are of the single-effect climbing film type, working under vacuum, and are of Monel metal construction. The plant is due for starting up in the coming year.

Fraser Build 90-ft. Column for Mexican Refinery

● **P**ART of an export order worth £100,000, a distillation column 90 ft. long, 13 ft. in diameter and weighing over 70 tons, has been fabricated by **W. J. Fraser and Co. Ltd.** at their Barnsley works. It is for the new Petroleos Mexicanos refinery at Minatitlan, Mexico, and is being shipped from Liverpool as deck cargo in m.v. *Adventurer*.

Weir Seawater Plant for South-West Africa

● **A**N order for a seawater distillation plant, capable of producing 120,000 gallons of fresh water daily from the sea, has been placed with G. and J. Weir Ltd., Glasgow, by the South-West African administration. The plant will be installed at Luderitz and is similar to a £250,000 plant just installed in Guernsey which produces 500,000 gallons of fresh water a day (*CHEMICAL AGE*, 8 October, p. 576).

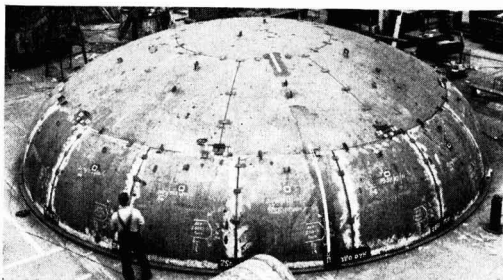
Export Orders for B.P. Units

● **E**XPORT orders worth £25,000 have been received by **Winston Electronics** for the B.P. 14 plate distillation unit which is used for the rapid economic assay of crude oil and for a wide range of organic distillation work in the laboratory. The equipment was developed in the laboratories of the British Petroleum Co. and Winston Electronics have the world rights.

Head Wrightson Acquire Sunrod Designs

THE transfer of the industrial boiler activities of Sunrod, heat exchange engineers of St. Mary Cray, Kent, to Head Wrightson Processes, a subsidiary of Head Wrightson and Co. will take place shortly at a date to be announced. Head Wrightson Processes are responsible for the group's nuclear research and nuclear power interests and specialise in the provision of heat transfer, cooling and water treatment equipment. The acquisition of the Sunrod designs will expand further the work of the industrial furnace division. Sunrod will in future concentrate on the sale, design and manufacture of patented heat exchangers.

A.B.P. Regenerator for Brefcon



Top head of a 35 ft. 8 in. inside diameter by 45 ft. long regenerator which Ashmore, Benson, Pease, and Co. (Davy - Ashmore Group) are fabricating in their South Works, Stockton-on-Tees. The equipment is being made for Brefcon (the consortium of British refinery constructors) on behalf of Petroleo Brasileiro S.A.

Swiss Chemical Industry Looks to 'Loose' Economic Tie-up of European Countries

WITH some 380 firms employing about 40,000 personnel, the Swiss chemical industry has an overall output which can be evaluated at about 1,700 million Swiss francs (£140 m.), no less than 80% of which is destined for export. In fact Swiss chemical exports, at around 226 Swiss francs per head of population, are considerably higher than those of other countries (Belgium-Luxembourg 124, United Kingdom 73, Germany 73, Italy 17 Swiss francs per head).

Table 1 gives a breakdown of export outlets.

Being poor in indigenous raw materials, the Swiss chemical industry is very largely a processing industry which produces finished products from imported materials. Table 2 shows the volume of Swiss chemical imports from various sources over 2½ years.

From the outset the Swiss chemical industry has taken a very positive attitude on the question of European economic integration. Political as well as economic considerations cause Switzerland to view the idea of joining the European Economic Community with disfavour; on the economic side, the inward-looking attitude of E.E.C.—i.e., its tendency to become a bloc run along

protectionist, centralistic and bureaucratic lines—is in conflict with the Swiss outward-looking economic credo. Among other considerations, the common outer tariff is a further hindrance from the Swiss point of view. Compared with those of the Swiss tariff, its rates for the chemical sector are on the average six to seven times higher. The following examples illustrate these disparities:

TABLE 3. COMPARISON OF E.E.C. AND SWISS CHEMICAL TARIFFS

Goods	E.E.C. tariff No.	E.E.C. rate on val.		Swiss rate on val. %
		%	%	
Potassium hydroxide ...	28.17	13	1.8	
Acetone ...	29.13	17	1.2	
Salicylic acid ...	29.16	21	0.9	
Heterocyclic compounds ...	29.35	10-25	0.6	
Provitamins and vitamins ...	29.38	9-18	0.6	
Antibiotics ...	29.44	9-21	0.6	
Medicaments ...	30.03	15-34	4.1	
Synthetic organic dye-stuffs ...	32.05	9-20	1.8	
Agricultural chemicals (excl. fertil.) ...	38.11	8-15	4.9	

A harmonisation of the Swiss rates with those of the common outer tariff of E.E.C. would entail serious consequences not only in the form of higher import charges with corresponding effects on the cost of both production and living; this measure would furthermore restrict the free supply and demand, thus giving the zonal suppliers an advantage.

Borax Bid £2.75 M. for Hardman and Holden

A CASH and share exchange offer worth about £2.75 million is being made by Borax (Holdings) Ltd. for the £750,000 capital of Hardman and Holden Ltd., Manchester. Terms are two Borax deferred ordinary 5s shares, plus 20s in cash, for every three 5s ordinary shares of Hardman and Holden. At Monday's closing prices, the bid is worth 18s 2d a Hardman and Holden share against a market price of 15s 7½d.

The directors of the Manchester company consider that the offer is "fair and reasonable" and are to recommend it to shareholders. The offer is another step towards the widening of Borax (Holdings) chemical interests and follows the acquisition earlier this year of a 55% stake in Spencer, Chapman and Messel Ltd.; this acquisition was made jointly with F. W. Berk.

Hardman and Holden shareholders will be entitled to a 5% interim for the year ending 31 March next; if the offer becomes unconditional, assenting holders will rank for a final Borax dividend which the directors forecast at 8½%. Set profits of H. and H. in the year to 31 March last were £128,000. Borax pre-tax profits for the nine months to 30 June 1960, were £3,150,000 (£2,653,000).

The Swiss chemical industry has continually stood up for the principle that Switzerland must be able to procure the raw materials for her production at any time at the place where they are available in the best quality and at the best prices.

The attitude of the Swiss chemical industry to E.F.T.A. is rather different; there are neither political nor economic scruples against joining this group. The Swiss view is that co-operation in the economic field should be based on definitely federalistic principles, and with the necessary respect for the sovereignty of the individual States. It is felt, consequently, that a functional rather than an institutional integration is needed.

The suggestion is made that a solution should be aimed at which, while fully respecting E.E.C. as an entity, would be applicable to the whole of Europe. This solution would involve, among other things, a substantial reduction in the envisaged outer tariff by the E.E.C. countries; it is also suggested that Britain and other countries with high national tariffs should follow this example. Another alternative is for E.E.C. to join E.F.T.A. as the eighth member.

The Swiss chemical industry is convinced that Europe should choose a 'looser' form of economic co-operation, and that this cannot be left to the Governments alone but should involve the co-operation of economic and industrial organisations.

For the foregoing picture of the Swiss chemical industry and its international outlook we are indebted to Ciba Ltd., of Basle, through their subsidiary, Ciba Laboratories Ltd., of Horsham, Sussex.

TABLE 1. EXPORT OUTLETS FOR SWISS CHEMICALS

	1958	1959	1960
	in 1,000 francs	in 1,000 francs	6 months in 1,000 francs
Germany ...	126,714	175,632	112,364
France ...	84,866	87,300	53,569
Italy ...	91,706	109,768	68,494
Belgium—Luxembourg ...	44,598	47,045	30,352
The Netherlands ...	30,675	40,250	25,025
Total for E.E.C. countries ...	378,559	459,995	289,804
United Kingdom ...	50,505	68,866	40,351
Sweden ...	31,928	34,388	20,299
Norway ...	5,197	6,979	4,702
Denmark ...	20,419	23,895	15,012
Austria ...	29,521	29,773	20,540
Portugal ...	16,704	18,563	9,205
Total for E.F.T.A. countries ...	154,274	182,464	110,109
United States ...	50,734	78,815	34,549
Other countries ...	531,529	612,302	336,941
Grand total ...	1,115,096	1,333,576	771,403

TABLE 2. SOURCES OF SWISS CHEMICAL IMPORTS

	1958	1959	1960
	in 1,000 francs	in 1,000 francs	6 months in 1,000 francs
Germany ...	209,040	285,407	134,043
France ...	75,574	105,272	72,561
Italy ...	30,449	40,006	29,695
Belgium—Luxembourg ...	18,387	18,168	12,048
The Netherlands ...	46,436	51,760	25,970
Total for E.E.C. countries ...	379,886	500,613	324,317
United Kingdom ...	44,190	54,136	28,870
Sweden ...	3,354	3,427	2,545
Norway ...	1,379	1,334	746
Denmark ...	5,249	7,594	3,358
Austria ...	2,378	3,946	3,841
Portugal ...	2,298	2,527	1,471
Total for E.F.T.A. countries ...	58,848	72,964	40,831
United States ...	121,353	133,940	78,245
Other countries ...	62,597	62,096	32,290
Grand Total ...	622,684	769,613	475,683

Fertiliser Subsidy Should Be Eased Off Says Sir C. Fison at F.M.A. Annual Dinner

FROM the point of view of the fertiliser industry, it would be better if the fertiliser subsidy for farmers was gradually withdrawn over a period of years, says Sir Clavering Fison, chairman of Fisons Ltd. He thinks it could safely be left to the industry, to the Government advisory services and to the national research stations to persuade the farmers to use the optimum amount of fertiliser.

Sir Clavering was speaking at the annual dinner of the Fertiliser Manufacturers' Association Ltd. and the Superphosphate Manufacturers Association Ltd., held at the Dorchester Hotel, London, 9 November. He recalled that the fertiliser subsidy, payable to the farmer on every ton of fertiliser used, was introduced when Government control of the industry was lifted in 1951 and has been stabilised more or less in the last few years. "Some of us thought, and I admit I was one, that the farmer could be persuaded to use more fertilisers without

a subsidy. In fact he cannot afford not to use more fertilisers, but I dare say the subsidy has done something to accelerate increased usage."

Sir Clavering went on to point out that from the industry's point of view the subsidy involves some risk. Increased production demanded a very big investment and production plans had to be made several years in advance. The industry had not been slow to find the necessary capital to meet all demands upon it, but the risk, of course, was that at the whim of the Government the rate of subsidy or the balance of the subsidy between the different plant foods might be drastically changed, and any big change could completely upset not only production plans but also the recommended and wise use of appropriate fertilisers. The industry certainly hoped that if changes were to be made they would be made in a very gradual way. As long as these large subsidies were paid and the risk of

violation changes existed, it would be found more difficult to raise capital for the fertiliser industry.

The industry itself had made, by price reductions, quite a contribution in the direction of optimum use of fertilisers, Sir Clavering pointed out. He had had a calculation made of the savings on the total fertiliser bills for the last three years due to these price reductions. That for this year had been estimated as the tonnage, of course, was not yet known. The total amount was over £11 million.

Earlier in his speech, Sir Clavering referred to the dramatic technological advances in the fertiliser industry during the last 30 years. "Furthermore, we are beginning to find out something about the chemical reactions which take place when the superphosphate and triple superphosphate are manufactured and when complete fertilisers are granulated. It is amazing how little we knew about this in the past and it is really surprising to know the true contents of the compound fertilisers the industry has been selling all these years."

Detailed knowledge of these matters was essential to advance in the field of water-soluble fertilisers and even more so in the wider range of citrate-soluble phosphate problems of importance in other countries. There was still an immense amount to learn about the changes which took place when the fertilisers were in the soil and when in contact with the roots of crops, but "the amount of research which is being directed to improve our knowledge of these matters leads me to think that we shall make further important advances in the next few years".

New Hants Research Laboratories for Metal Containers

BUILDING of a new research laboratory at Passfield, Hants, for Metal Containers Ltd., 17 Waterloo Place, London S.W.1, is well under way. The 10-acre rural site was chosen after an intensive search. The buildings have been designed for flexibility of extension.

The company, with its U.K. associated companies, is the largest manufacturer of steel containers in Britain, operating six factories for the manufacture of steel, fibre and plastic containers as well as a closure manufacturing plant.

Internationally, the company is part of the Van Leer Group, which originated in Holland and comprises 35 factories throughout Europe, Africa, Asia, and South America.

The decision to divorce research from factory operations was taken two years ago, and implementation of this policy was precipitated by a recent agreement between the Van Leer Group and the Inland Steel Container Co., the Container Division of the Inland Steel Co., Chicago. The agreement provides for joint research and development and pooling of technical information.

The two groups now jointly own the Grotmes Machine Works in Chicago, previously a wholly owned subsidiary of Van Leer, engaged in the manufacture of industrial equipment including container-making machinery. Van Leer already operate development facilities in Holland.

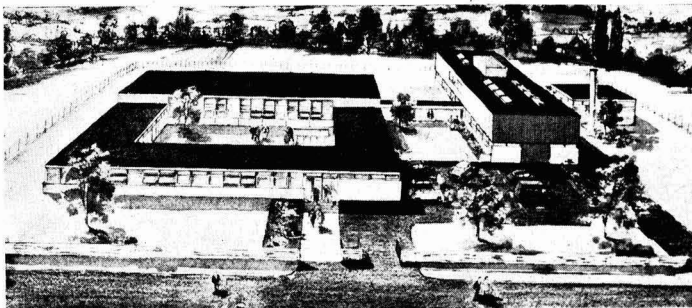
B.T.R. Introduce New P.V.C. Coating

AVAILABILITY in the U.K. of a new corrosion-resistant sprayed p.v.c. coating which is thought to have a wide potential application in the chemical industry is announced by B.T.R. Industries Ltd. as an addition to their Synco range of corrosion-resistant materials. The company will market this material under an exclusive licence agreement with *Gewerkschaft Keramchemie* of Western Germany.

The coating is claimed to offer resistance to corrosive media ranging from alkalis to oxidising acids, from fatty acids and their esters to petroleum hydrocarbons and alcohols. It can also be used on structural steelwork and factory plant, as floor covering and for the protection of concrete, brickwork, iron and non-ferrous metals. Applied either in B.T.R.'s factories or on site, it is stated to be diffusion proof and usable under high mechanical stresses at operating temperatures up to 70°C. Abrasion resistance and impermeability are further advantages claimed.

B.C.P.M.A. Annual Dinner

Attendance at the annual dinner of the British Chemical Plant Manufacturers' Association totalled 900 and not 1,350 as stated in *CHEMICAL AGE*, 5 November, p. 762.



Artist's impression of the new Metal Containers Ltd. research laboratories at Passfield, Hants

Kerala Fertiliser Company Has £3.75 M. Expansion Project

Progress of New Developments in India

AMONG the notable developments in the inorganic chemicals field in India is the expansion programme, involving an outlay of £3.75 million, that has been embarked upon by the Kerala firm of Fertilizers and Chemicals Travancore Ltd. The first stage envisages doubling the output of ammonia to increase ammonium sulphate production to 225 tons/day and also the manufacture of 100 tons/day of ammonium phosphate. The additional hydrogen required will be produced by the electrolytic process. A new sulphuric acid plant of 160 tons/day capacity, recently commissioned, has increased the firm's installed capacity for the acid to 97,000 tons/year—the highest in India. A unit, the first in India, for the recovery of the acid plant tail gases, and production of 10 tons/day of liquid sulphur dioxide, has also been brought into commission.

In the second stage of expansion, the modern oil gasification process will be used to replace the present 'firewood' process for producing hydrogen. The capacity of the new plant will be sufficient to make 80 tons/day of ammonia. By the end of 1961, the total annual capacity of the plant will be 100,000 tons of ammonium sulphate, 33,000 tons of ammonium phosphate, 44,000 tons of superphosphate, 97,000 tons of sulphuric acid and 8,000 tons of ammonium chloride.

Caustic and Chlorine

Nepa Chemicals, a new company, is setting up a plant at Neapanagar in the State of Madhya Pradesh for producing caustic soda and chlorine (capacity 12 tons and 10 tons/day respectively). The South Indian firm of Mettur Chemicals will provide technical advice and assistance for this £525,000 project.

The East German firm, DIA Invest, is collaborating with Travancore Electrochemical Industries Ltd. in the setting up of a modern 10,000 tons calcium carbide plant near Kottayam in Kerala State. Capital outlay on the project is estimated at £187,500.

Two months ago Industrial Chemicals Ltd. commissioned their new 10,000 tons plant at Coimbatore (Madras).

The Durgapur carbon black project of the Philips Petroleum Co. of New York in collaboration with Duncan Brothers of Calcutta was discussed in CHEMICAL AGE, 16 July, p. 110. The project is estimated to cost £1.23 million. Indian requirements of carbon black are at present met largely through imports, which amounted to 27.71 million lb. in 1959.

Organic Chemicals. Nearing completion

at Trombay, near Bombay, is the largest manufacturing unit in India for producing alcohol-based chemicals. This is Union Carbide's £3.37 million project which will produce annually 15 million lb. of industrial organic chemicals and polythene worth £1.87 million a year.

Indian Newsletter

- Government's assurance on prices spurs private fertiliser enterprises.
- Ammonia output to be doubled in first stage of £3.75 m. expansion by Fertilizers and Chemicals Travancore.
- £525,000 chlorine/caustic project in Madhya Pradesh.
- German equipment for citric acid project.
- India's first plant to manufacture melathion insecticide gets Japanese technical aid.

Initial plans include manufacture of acetic acid, butanol, butyl acetate and ethyl acetate besides polythene.

India's requirements of citric acid and citrates as well as those of other Eastern countries have been met by imports from Europe and the United States. A new company, Citric India Ltd., now being set up in the State of Maharashtra (recently carved out of the former State of Bombay) will manufacture annually 1,500 tons of citric acid and citrates from sugarcane molasses when it goes into production in 1962. The company has entered into an agreement with the West German firm, Standard-Messo Gesellschaft für Chemietechnik m.b.H. and Co., Duisberg, for purchase of plant and machinery as well as for its commissioning. The capital cost of the project is estimated at £675,000.

Insecticides. Pesticides and insecticides, such as BHC, melathion, zinc phosphide, 2:4-dichloro-phenoxy acetic acid, and mercury compounds will be manufactured at Thana, near Bombay, in a 30-ton plant being promoted by Bharat Pulverish Mills Private Ltd. in technical collaboration with the Japanese firms, Itoh and Co. and Kureha Chemicals Industry Co. Scheduled to go into production by 1962, the plant will be the first in India and the East to manufacture melathion.

Next to Tata Chemicals and Imperial Chemical Industries, who between them produce about 4,000 tons/year of BHC, this unit will be the biggest producer of

this chemical. Project costs are estimated at about £375,000.

Synthetic Pine Oil. India's first synthetic pine oil factory, set up by Prabhat General Agencies, went into production recently at Hoshiarpur (Punjab). The plant will produce 300 tons/year of pine oil from turpentine by a process developed by Indian workers. Over 900 tons of pine oil are at present imported.

Tonnage Oxygen. A key unit of the Rourkela Steel Plant (set up recently with West German collaboration), is a plant, the first of its kind in India, to produce 300 tons/day of oxygen for the manufacture of ingot steel by the L.D. process and 540 tons of pure nitrogen for the fertiliser plant now under erection.

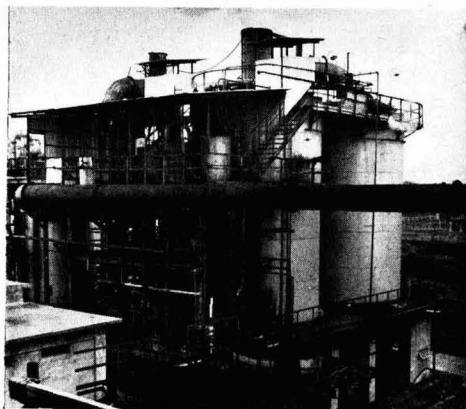
Aid for Fertilisers

Fertiliser Industry. Prospects of the inflow of foreign capital into the Indian fertiliser industry have brightened. As stated in CHEMICAL AGE, 25 June, p. 1069, India is to step up its fertiliser production to 1 million tons of nitrogen and 500,000 tons of P_2O_5 fertilisers by 1965-66, of which private undertakings are to contribute 200,000 tons of nitrogen and all the P_2O_5 . The Government has recognised in principle the right of the new private factories to sell in the open market at an uncontrolled price. On the other hand it is probable that the existing pool system, under which all output is sold to Government at controlled prices, may continue till the present shortage is met. In that event Government has assured the same price to private factories as may be paid to Government undertakings for a comparable quality and composition of fertiliser produced from comparable raw materials. This applies only to nitrogenous fertilisers; phosphatic and other special fertilisers will continue to be sold outside the pool.

American Offers. The clarification has had a very heartening response and at least five foreign companies, including four American, are competing as collaborators for the plant (based on Caltex Refinery gases) to be set up at Visakhapatnam (Andhra Pradesh) at a cost of £18 million. Two or three firms are interested in the Hanumangarh factory in Rajasthan which would cost £19 million.

The Union Commerce and Industry Ministry in New Delhi has also received applications for starting fertiliser factories in the States of Uttar Pradesh and Madhya Pradesh. The former has plans to set up three units totalling a capacity of 180,000 tons annually in terms of nitrogen. Madhya Pradesh will have a plant with a minimum capacity of 60,000 tons in terms of nitrogen; it is estimated to cost £15 million.

In Madras State the West German organisation, Chemiebau Dr. A. Zieren Gambell and Köln am Rhein, will col-



First of its kind in India, this plant for the recovery of acid plant tail gases at Alway (Kerala State) produces 10 tons/day of liquid sulphur dioxide

laborate in setting up for Premier Fertilizers Ltd., a plant at Cuddalore with a capacity of 40,000 tons of superphosphate and 16,500 tons of sulphuric acid. The factory is expected to go into production early in 1962. Sulphur and rock phosphate for the plant will be imported from abroad.

British Loan. The Commonwealth Development Finance Corporation Ltd. has signed an agreement with East India Distilleries and Sugar Factories Ltd. of Madras for a loan of £600,000 as part of the financing of a compound phosphate fertiliser plant to be erected at Ennore, near Madras. The plant will have an annual capacity of 51,000 tons.

Main contractors are Simon-Carves Ltd., Cheadle Heath, Stockport, Ches.

Government Sector. In the Government sector, the £23.25 million Nangal plant in Punjab State will be the first unit (other than Sindri Fertilizers which is already in operation in Bihar) to go into production; this will be in April 1961 subject to availability of power from

Bhakra hydro-electric scheme. Capacity of the plant is 1,200 tons/day of ammonium nitrate. The factories at Rourkela (Orissa) and Neyveli (Madras) are scheduled to commence production in 1962 and 1963 respectively. The Nahorkatiya project in Assam, based on Barauni and Gauhati refineries, will produce 32,500 tons of nitrogen (urea and ammonium sulphate 50,000 tons each).

At Trombay (Bombay), the factory building for the fertiliser plant is under construction, while in West Bengal, negotiations for the establishment of fertiliser factory at Durgapur between the State Government and the Japanese collaborating firm are believed to have met with some difficulties.

It has been announced that all fertiliser plants operated by Government will be brought under the management of a single Corporation, Hindustan Chemicals and Fertilizers Ltd., so as to ensure better control and efficient functioning of various units.

with the thinnest possible layer of foam capable of providing an efficient "blanket." It is therefore vitally important to know the so-called "critical thickness" of foam. Special equipment for measuring this has been developed at the Fire Research Station.

It has been found that the stiffer foams seal a flammable liquid surface with a thinner layer than do the more fluid foams. They also break down less readily. In practice, however, it is more difficult to get them to spread over the surface as readily as the more fluid foams.

Therefore, in order to obtain the most efficient use of foam, improved methods of applying stiffer foams—such as spray application—are required. Work on this problem is continuing.

The dusts produced by many manufacturing processes in the chemical, metallurgical and plastics industries are potentially explosive if dispersed in air. A standard method of assessing the risk has been developed in which dust is blown into a tube and dispersed in the presence of a source of ignition. On the basis of these tests, dusts are classified according to their liability to explode.

From the results of tests by the Factory Inspectorate it is possible to specify what precautions must be taken to render the manufacturing process safe.

Reed Enter Plastics Packaging Field

ALBERT E. Reed and Co. Ltd., of the paper group, are entering the field of plastics containers by establishing a company called Reed Plastics Packaging Ltd. Reed will hold 60% of the capital of the company, the remainder being held by Polythene Drums Ltd., of Middlesex, whose proprietors have agreed to merge their interests in packaging with those of the Reed Paper Group.

The new company will market a range of standard plastics containers initially in 5-45 gallon sizes and will introduce a new range of fibreboard-clad polythene containers which will be marketed by Reed Corrugated Cases Limited, another member of the Reed Packaging Division. (For directors of new company, see CHEMICAL AGE, 12 November, p. 528).

D.C.L. Hold Two-day Safety Conference

DELEGATES at a two-day safety conference held recently at Sanderstead, included 80 safety officers and representatives of the Distillers Co. Ltd.

Four papers were presented at the conference: 'Safety training'; 'Some aspects of safety in the handling of highly flammable liquids'; 'Safe use of electricity'; and 'Investigation of accidents.' To illustrate his talk on flammable liquids, Mr. J. Howlett, a director of the D.C.L. Chemical Division used a film made for the purpose at the division's Hull factory.

A great interest was shown in all papers, from which many new ideas on accident prevention arose, and the question times and forum period were fully taken up with lively discussion.

Chemical Engineering Problems Studied at New Fire Research Labs.

BUILT at a cost of about £300,000, the new laboratories at the Fire Research Station, Boreham Wood, Herts, officially opened on 4 November by Lord Hailsham, Minister for Science, are claimed to make the station the largest and best equipped organisation of its kind in the world.

To mark the occasion, a series of open days were held last week (7 to 11 November), and practical demonstrations were given to illustrate the applications of fire research in industry and Government departments.

An important section of the laboratories is devoted to chemistry and chemical engineering and is concerned with industrial fires and explosions involving gases, vapours, dusts, and unstable materials not classified as explosives. In collaboration with the extinguishing materials and equipment section, studies are being made of the means of extinguishing fires in flammable liquids, the use of vapour-phase inhibit-

ing agents, and the possibility of extinguishing fires in buildings by filling the interior with inert gas.

Although this last method was demonstrated during the open days, it is still in the very early stages of development. The experimental inert gas generator was assembled for the Fire Research Organisation by the National Gas Turbine Establishment. It consists of a Viper turbojet engine with a reheat section added, mounted with its fuel tank and control equipment on a three ton lorry. Water is injected into the exhaust gas, reducing the temperature and at the same time reducing the oxygen concentration to about 7%, a figure too low generally to support combustion. Capacity of the experimental generator is about 40 to 50 thousand cu. ft./min.

As the amount of foam available for fighting a flammable liquid fire is often limited and at the same time it is often vital to subdue the fire rapidly, it is necessary to cover the burning liquid

Overseas News

ALLIED CHEMICAL ACQUIRE SNIA VISCOSA CAPROLACTAM RIGHTS FOR NORTH AMERICA

EXCLUSIVE rights for production of caprolactam by the Snia Viscosa process in the U.S. and Canada go to Allied Chemical, New York, under an agreement signed between the American company and the Italian Snia Viscosa concern recently.

Allied Chemical, the only producers of caprolactam in the U.S., recently embarked on an expansion programme at their Hopewell, Va., caprolactam monomer plant (CHEMICAL AGE, 17 September, p. 431). Their own process, however, is based on phenol whereas the Italian process utilises toluene.

In the U.K., Courtaulds recently acquired production rights of the Snia Viscosa process (C.A., 30 July, p. 164).

Amoco to Increase DMT Capacity

Construction is underway on new facilities at the Amoco Chemicals plant at Joliet, Ill., which will raise dimethyl terephthalate capacity by 50%. The raw material used for the DMT production in the Amoco plant is terephthalic acid purified as the ester.

£30 M. Expansion Plan for Sasol Oil-from-coal Plant

A £30-million, seven-year expansion plan which would almost double the output of the Sasol oil-from-coal undertaking was announced in Pretoria last week by Dr. T. E. Donges, acting Minister of Economic Affairs. Government approval has been given to starting of the expansion programme when the current programme ends, which will be within the next few months. Finance for the expansion will be supplied largely by Sasol itself but part will be raised by private short-term loans.

Objectives of the plan are to keep pace with the demand for Sasol petrol, solvents, waxes and chemical intermediates; to increase the volume and value of production on existing sites; to improve the overall economics of the undertaking; and to add certain chemical operations which will be the basis for an "outside" chemical industry.

It is estimated that by 1968 Sasol should be able to sell petrol and other products to a value of £18 m. a year.

U.S. Sea Water Plant uses Flash Distillation

A new sea water conversion plant will be built by the U.S. company, Westinghouse under a \$1.6 million contract from the Department of Interior. The plant situated at Point Loma, Calif., will convert 1 million gall. of sea water to fresh water per day. The water will be bought

by San Diego and the state of California will contribute up to 50% of the construction costs. This plant replaces a saline water conversion plant using a nuclear reactor heat source which was banned by the Atomic Energy Commission on safety grounds.

Chemical Investment Failure in Czechoslovakia

Over the first half of the current year chemical plant investment programmes were filled to only 38% of the target, it is stated in Prague. Blame is given to delayed deliveries of plant and the lack of trained staff. According to *Rude Pravo*, the construction of only one-half of the sulphuric acid plants planned under the country's third Five-Year Plan is guaranteed.

Stereospecific Rubbers Pilot Plant

General Tire and Rubber Co. have awarded Crawford and Russell Inc., Stamford, Conn., a contract to design and engineer a pilot plant, which will be located at Mogadore, Ohio, for both continuous and batch polymerisation of isoprene and butadiene to produce stereospecific synthetic rubbers. Two reactors, specially designed for polymerisation under very high viscosity conditions, will be used in the new plant.

General Tire and Rubber will evaluate the new stereospecific rubbers in tyres and other rubber products.

Shell Canada to Make 1,000 tons/day of Sulphur

A \$20 million gas-processing and sulphur manufacturing plant will be built by Shell Oil Co. of Canada Ltd., in the Pincher Creek district of southern Alberta. It is expected construction will be finished before the end of 1961.

The plant will be initially designed to produce approximately 100 million cu. ft. of processed gas a day for delivery to Alberta and Southern Gas for export to the U.S. It will also produce about 1,000 tons of sulphur a day and between 3,500 and 4,000 barrels of liquid products a day.

South African Urea Plant Completed

The first South African plant for the manufacture of urea fertiliser has been completed at Modderfontein (Transvaal) and was due to be opened on 17 November. The plant, which cost £4 million, is part of a £10 m. extension programme to the Kynoch Capex fertiliser factory, which is expected to make South Africa self sufficient in nitrogen fertilisers.

The plant is capable of producing 110,000 tons of urea a year. It is expected that the production rate of 300 tons/day will exceed local demands for some time, and a large export market is aimed at. It is also expected that prices can be brought down lower than the cost of imported urea.

Semi-commercial Chemical Plant for Hooker

Centralised and more efficient production of a number of chemicals which have grown to a sales range of \$25,000 to \$100,000 per year, but have not reached commercial-scale volume, will be made possible by a new \$1½ million semi-commercial scale plant on which Hooker Chemical Corporation have begun construction at Niagara Falls, N.Y., scheduled for completion in 1961. The new unit will be operated by the re-aligned corporate research and development department.

Carnauba Wax Substitute from Sisal Waste

The National Chemical Laboratory, Poona, India, is reported to have developed, from sisal waste, a suitable substitute for Carnauba wax as an essential constituent of polishes for shoes and automobiles. Carnauba wax is not produced in India and her requirements are met from imports only. It is claimed that a high-quality wax is obtained by the new process.

American Cyanamid's Expansion in West Europe

American Cyanamid state that between 15 and 20% of the \$40-50 million to be invested over the current year will be spent on the expansion of foreign plants, particularly in West Europe. The company is represented in both Formica International Ltd. and Cyanamid-Ketjen N.V., each of whom are carrying through expansion schemes. American Cyanamid are also planning chemical industry expansion programmes in Sicily and elsewhere.

Celanese to Start Full-scale Production of Butylene Glycol

A 1,3-butylene glycol plant, which Celanese Corp. of America claim to be the first full-scale commercial plant in the U.S., is being built at the Celanese Bishop, Tex. site. The new plant to be completed early next year will have an annual capacity of 25 million lb. Celanese at present make 5 million lb. per year in a semi-commercial operation.

Molten Salt Reactor Experiment for U.S.A.E.C.

The Atomic Energy Commission will build a \$4 m. experimental reactor of the molten salt type at the Oak Ridge (Tennessee) National Laboratory as a part of the Commission's effort to investigate advanced reactor concepts having potential advantages for power

production. Design of the reactor is now under way.

The molten salt reactor concept offers the potential economic advantages of improved steam conditions and high efficiency through operation at very high temperatures and specific power. Since the fuel is in solution, no fabrication of fuel elements is necessary and continuous removal of fission poisons is possible, thereby providing greater neutron economy.

Hooker Produce TKPP Detergent Material

A new commercial-scale plant to manufacture tetrapotassium pyrophosphate (TKPP) has now gone into production at the Jeffersonville, Ind., plant of Hooker Chemical Corporation's Phosphorus Division. TKPP is a key chemical in the manufacture of heavy-duty liquid detergents for household use. Because of greater solubility characteristics than sodium phosphates, it is also expected to find some applications in the industrial all-purpose cleaner field where sodium phosphates (also made by Hooker at several plants) are now being used.

Basic raw materials for TKPP are phosphoric acid and caustic potash, both made by Hooker.

\$125 M. Synthetic Rubber Expansion for Goodyear

The Goodyear Tire and Rubber Company are to spend \$125 m. on expanding the facilities at Akron, Ohio, for the production of Chemigum (nitrile) rubber and synthetic latices. The programme is scheduled for completion by next June.

Canadian Economic Policy Under Fire

Dissatisfaction with the Canadian economic system in the respect that it was directed to the support of exports even at the expense of other sectors, was expressed by W. N. Hall, president of Dominion Tar and Chemical Co. Ltd., speaking at a seminar on "The Chemical Industry, Canada and the U.S." organised by the Chemical Institute of Canada and the Commercial Chemical Development Association. Mr. Hall said that Canada had a peculiar policy which directs the trading of its goods which other countries need for goods which Canada does not need—such as chemicals that are already made in Canada.

What export business the Canadian chemical industry did have was facing stiff competition from Europe. Meanwhile imports to Canada were on the increase and many European countries subsidised their exports. There are examples of chemicals coming into Canada at prices lower than the world price for the raw material from which they are made, said Mr. Hall.

Another cause of dissatisfaction is that Canada has an anti-dumping law which apparently cannot or is not operated. It is effective against the U.S. because most U.S. companies do not, said Mr. Hall, knowingly break Canada's laws.

In conclusion it was stated that the Canadian chemical industry has been largely built up by U.S. capital particularly since 1945, but there will be a serious curtailment in investment unless there are steps taken by the Canadian Government to create a climate which will encourage further industrialisation in Canada.

Mallinckrodt Nuclear Fuel for U.S. Reactor Experiments

The Mallinckrodt Nuclear Division of Mallinckrodt Chemical Works report the signing of contracts with Combustion Engineering, Windsor, Conn., to furnish 1,050 lb. of uranium oxide pellets for the NUSU (nuclear superheat) critical experiments and 3,300 lb. of UO_2 pellets for the BONUS (boiling nuclear superheat) critical experiments. The uranium oxide, enriched to 3.41% U-235, totals 4,350 lb., or more than 100,000 pellets.

The Combustion Engineering work is part of the Atomic Energy Commission's development programme to establish design criteria for large integral boiling superheat reactors.

Market Research Seminar in U.S.

The European Productivity Agency proposes to send 15 European industrial marketing consultants to a seminar at Indiana University in February next. Lasting two weeks, the programme will include lectures by U.S. experts followed by a week of selected company visits.

Interested organisations should contact Miss M. E. Quick, I.M.2 Division, Board of Trade, Horse Guards Avenue, London S.W.1 (Trafalgar 8855, Extension 7641), by Friday, 18 November.

Australian Merger Bid by Petrochemical Holdings

A take-over offer worth £A1.4 million for 1 million of the issued shares of

Petrochemical Holdings has been made by the Bitumen and Oil Refineries Australia (Boral). If the present offer is accepted Boral, who already own at least 300,000 Petrochemical shares, will increase their holding to 55%. A large block of shares would still remain in public hands.

The purpose of the proposal is the integration and joint development of the activities of the two companies, which already have management links.

Petrochemical are a holding company of the Paccal Group which draws its crude oil requirement from Boral.

Polyhydric Alcohols Give Aqueous Foams

By replacing water with polyhydric alcohols, non-aqueous aerosol foams can be made in which foam density, stability and wettability can be varied at will. Du Pont's Freon products laboratory has investigated a number of systems and finds that non-aqueous foams are denser and more stable than foams made with water. Du Pont have suggested that non-aqueous foam systems will find uses in pharmaceutical and cosmetic products.

Iso- and Terephthaloyl Chlorides from Hooker Chemicals

High purity isophthaloyl chloride and terephthaloyl chloride are now available in semi-commercial quantities from the Eastern Chemical Division of Hooker Chemical Corporation at Niagara Falls, N.Y. These bifunctional acid chlorides are important raw materials for synthetic fibres and uses are also being found as intermediates in the pigment, pharmaceutical, adhesive, and rubber industries. Prices in various quantities are now upwards of \$/lb., but large commercial quantities later are projected to be in the range of \$0.35 to \$0.50/lb.

Chemico Perfect Method for Producing Alum by Continuous Pressure Digestion

AN improved process for the manufacture of liquid and solid alum which results in considerable savings in investment, labour and production costs has been perfected by Chemical Construction Corporation, New York. Claimed to be the first commercially feasible process based on a continuous pressure acid digestion of ore followed by filtration, it is said to increase the utilisation of the Al_2O_3 content of the ore by as much as 10% over conventional processes.

Chemico were led to the new process by their development of a technique for the recovery of metals from low grade ore. The experience gained by Chemico engineers formed the basis for overcoming the corrosive and erosive conditions inherent in the digestion steps of the process. It is stated that, because of this unique system, a finished batch can be

completed in less than three hours as compared to three days normally required in the existing processes.

To illustrate the space saving feature of the new process, Chemico cite the example of a 60 tons/day plant, which with the older process would require three 16 ft. by 16 ft. digesters, which are replaced in the Chemico process by a single 4 ft. 9 in. by 16 ft. horizontal autoclave.

A further advantage claimed for the process is the utilisation of a relatively coarse bauxite feed (plus 8 mesh) which considerably reduces the investment in grinding and material handling equipment as well as operating costs.

Chemico are offering single units of up to 120 tons/day capacity and, for smaller plants, package units of 5, 10 and 30 tons/day.

Bookshelf

REVISED TEXT ON PHYSICAL METHODS OF ANALYSIS

PHYSICAL METHODS IN CHEMICAL ANALYSIS. Edited by *Walter G. Berl*. Vol. I, 2nd Edition. Academic Press, New York and London, 1960. Pp. xiv + 686. 135s 9d.

The 'Berl' series of volumes, introduced in 1950, aimed at giving a grounding in the basic principles, instrumentation, techniques and applications, of the more modern physical methods "as soon as they reached a stage of usefulness to the analyst". Vol. I dealt with the various methods concerned with the interaction of radiation with matter; in his preface to this 2nd (revised) Edition, Berl states that the material of the 1st Edition has been rewritten, revised, and brought up to date.

The 11 chapters deal with Absorption phenomena of X-ray and γ -rays; X-ray diffraction methods (powders and metals); X-ray diffraction as applied to fibres; Spectrophotometry and absorptiometry; Emission spectrography; Infra-red spectrometry; Raman spectra; Refractive index measurement; Mass spectrometry; Electron microscopy; Electron diffraction.

As several of the contributors point out, the chapters do not attempt to present comprehensive reviews. The major criticism about this book is that, for an expensive text, the attempts to bring the chapters really up to date are inadequate. Thus the chapter on 'Emission spectrography' lists no reference more recent than 1950; the chapter on 'X-ray diffraction as applied to fibres'—surely a very topical field—has, of its 105 references, only three dated 1956 and four dated 1955. The chapter on Infra-red spectroscopy refers to 1959 work (two references out of 85 listed) but unfortunately quotes 'Bibliography of published information on infra-red spectroscopy, Vols. I and II. H.M.S.O. 1955' as the most recent collection of abstracts of I/R literature.

This book is excellently printed and produced, but is undoubtedly much too expensive. It is not a book for the specialist, although for honours students it offers an adequate introduction to modern physical methods.

D. M. W. ANDERSON

► Man-made Fibres

MANUAL OF MAN-MADE FIBRES. By C. Z. *Carroll-Porzynski*. Astex Publishing Co., 22 North Street, Guildford, 1960. Pp. 304. 29s.

The book is divided into 10 parts: World production and classification of textile fibres (7 pages); natural polymer man-made fibres (34 pages); synthetic polymer man-made fibres (79 pages); inorganic fibres (25 pages); textured yarns (13 pages); identification (6 pages); photo-

micrographs (44 pages); X-ray diffraction photographs (19 pages); bibliography (39 pages); producers and index (23 pages). The book contains 240 illustrations about half of which are photographs reproduced in half-tone on art paper. Manufacturing flow sheets, stress-strain diagrams and full tables are given for each fibre. The full bibliography which is classified and lists titles is drawn from the patent and journal literature. The book is well bound and nicely produced.

► Polymer Chemistry

DI E CHEMIE DER KUNSTSTOFFE. By *Karl Hamann*. de Gruyter Co., Berlin, 1960. Pp. 143. DM3.60.

This paperback booklet is one of the Göschel series, which covers a wide field in natural and moral science and languages. Vol. 1173 deals with the chemistry of polymeric materials, their synthesis and constitution, and the chemical reactions of the polymers themselves. Most of the examples taken are of synthetic materials, which are treated first, but a short chapter describes some natural macromolecules. Physical properties are barely mentioned, as this is no 'popular' treatment, touching also on the kinetics and mechanisms of polymerisation processes. It would serve therefore as an introductory survey of polymers and polymerisation for the degree student.

► C. S. Annual Reports

ANNUAL REPORTS ON THE PROGRESS OF CHEMISTRY, VOL. 56. Chemical Society London, 1960. Pp. vi + 476. 40s.

This year's Annual Reports contains a notice from the society asking members to sell back their volumes for 15 recent years. There could be no more eloquent testimony to the reputation of the series. No scientific periodical can stand still; annuals are no exception. A few years ago the publication of the excellent Annual Reviews of Physical Chemistry obviated the need for the severely condensed reports that were issued by the Chemical Society. A new approach has been attempted under the editorship of J. W. Linnett. Now a few topics of contemporary interest are reviewed by acknowledged experts. Each is allotted 10-15 pages and writes for the cognescenti. This represents a partial return to pre-war practice, though the topics now cover a rather narrower field. The venture is successful.

Inorganic (48 pages), Organic (163

pages) and Analytical (48 pages) are treated in the familiar comprehensive and highly condensed manner. Although the editor of Biological Chemistry (51 pages) has collected articles on four topics which should appeal to those without biochemical training, it is doubtful whether the section should be continued. Annual Reviews of Biochemistry is very good and serves most people's needs. Organic Chemistry could well use any pages that the publisher can spare.

The writing of Annual Reports is not one of the more exhilarating literary activities. All chemists should be thankful that able authors are forthcoming every year to produce the articles in this series.

► Radiation Chemistry

RADIATION CHEMISTRY OF ORGANIC COMPOUNDS. By *A. J. Swallow*. Pergamon Press, London, 1960. Pp. xiv + 380. 84s.

The author states that the aim of this book is two-fold: to present an overall picture of the subject and to review all the published work in the field. The chapters are headed: General introduction (22 pages), Experimental methods (22), Water and aqueous systems (16), Aliphatic compounds (63), Aromatic compounds (24), Polymers (27), Dye-stuffs (11), Substances of biological interest (56) and Radiation chemistry and other fields (43). There are 64 pages of bibliography, whose minor limitations are clearly described by the author in his preface. The author chiefly recounts experimental facts; there is little attempt at detailed theoretical treatments. The book will principally appeal to the research chemist in search of a comprehensive review of the subject.

► Chemical Bonding

ATOMBAU UND CHEMISCHE BINDUNG. By *F. Seel*. Enke, Stuttgart, 1960. Pp. vi + 96. DM11.50.

The subtitle of this volume is 'An elementary introduction to the basis of the modern theory of chemical bonding', and the first edition (published in 1956) was based on five lectures given by the author. The book which has been revised and expanded, now appears in its third edition. The elementary ideas of the quantum theory of valency are described in non-mathematical terms with the aid of excellent diagrams. The author mentions, and briefly describes the more important topics of elementary quantum theory of valency, but omits a great deal of detail in the interests of brevity. The first 15 pages of the book deal with the electronic structure of the atom, and the remaining 77 pages include a brief description of ionic bonds, ionic radii, complex compounds, covalent and delocalised bonds, mesomerism, stereochemistry, intermetallic compounds, dipole moments and some other topics related to the quantum theory of valency. Students seeking a brief non-mathematical introduction to the quantum theory of valency will find this book very useful.

Bookshelf (contd.)

RECORD OF I.U.P.A.C. SCIENTIFIC WORK

PURE AND APPLIED CHEMISTRY, VOL. 1, No. 1, Butterworths, London, 1960. Pp. 186. £6 per volume, to be published irregularly.

This journal, the official journal of the International Union of Pure and Applied Chemistry, is intended to bring together for reference all the scientific work of the union. Since the reports deal with widely different aspects of chemistry, an arrangement has been made for separate issues and for the sale of reprints in pamphlet or book form, as appropriate, of each particular article, report or symposium. The first issue contains a Foreword by H. W. Thomson (2 pages); The organisation and functions of I.U.P.A.C. by W. A. Noyes Jr. and N. W. Thomson (6 pages); proceedings of Radioactivation Analysis Symposium, Vienna, June 1959 (122 pages); recommended test substances for the microdetermination of carbon and hydrogen (4 pages); report on the calibration of wavelength and photometric scales of non-recording spectrophotometers by A. C. Menzies (16 pages); report on the standardisation of pH and related terminology by R. G. Bates and E. A. Guggenheim (6 pages); terminology for scales of working in microchemical analysis (2 pages); recommendations for terminology to be used with precision balances (6 pages); preliminary recommendations on nomenclature and presentation of data in gas chromatography (9 pages).

'Pure and Applied Chemistry' can be unreservedly welcomed; it does not merely duplicate existing facilities for publication. Its field will be chiefly those reports of standardising committees which have no alternative outlet.

► Salt and Brine

SODIUM CHLORIDE. By *D. W. Kaufmann*. Reinhold; Chapman and Hall, London, 1960. Pp. xvi + 743. 160s.

With the aid of contributions by 19 other specialists, the author has produced a technical book of 26 chapters which is stated to be the first and only comprehensive treatment on the production and properties of salt and brine. The first chapters deal with the mineralogy, petrography, geology, U.S. deposits and solar production of salt. Mining, milling, wells and pipelines, purification and evaporation processes, types of salt and salt solvers are then covered. The next nine chapters deal with salt and brine analysis, specifications, medicinal and nutritional aspects, materials used in and methods of handling and storage, and low temperature properties and uses. About 120 chemical reactions and 70 tables of the physical properties cover-

ing all phases occupy two chapters followed by a review on the many industrial applications of salt. The book is a useful reference source for those concerned with salt production and its analysis, for those who need condensed accounts of its practical applications and as a reference source of data on the properties and reactions of the pure material.

► Molecular Distillation

MOLECULAR DISTILLATION. By *G. Burrows*. Clarendon Press, O.U.P., 1960. Pp. x + 214. 35s.

This monograph, which belongs to the Oxford series on the Physics and Chemistry of Materials, has been written by a member of the research staff of Associated Electrical Industries (Manchester) Ltd. It is claimed to be the first comprehensive treatment of the subject whose successful practice requires the collaboration of chemist, physicist and engineer. The discussion is in terms of simple kinetic theory and the standard terminology of distillation processes. Chapters of approximately equal length cover basic theory, theory of operation, representation of results, vacuum technique, mechanical design, physical design, examples of apparatus, operation and control, utilisation of the process. The book is intended for those in research laboratories and for chemical engineers concerned with high vacua. There are 41 figures and four plates.

► Organic Analysis

ANALYTISCHE TRENNUNG UND IDENTIFIZIERUNG ORGANISCHER SUBSTANZEN. By *O. Neunhoeffer*. Walter de Gruyter and Co., Berlin, 1960. Pp. xii + 116. DM18.

This book is a manual of organic qualitative analysis, of normal scope. A preliminary section on methods of purification and on melting points is followed by 10 pages correlating structural modifications with various physical properties, such as volatility, melting point and solubility, concluding with a section on optical properties (refractivity, fluorescence, absorption, optical activity). The treatment of each topic is brief, particularly of the last group; no experimental directions for the use of any of the relevant instruments are given and this section is not correlated with the subsequent scheme of analysis. The principles involved in separation of mixtures, and the uses of a range of 14 classification reagents are discussed without experimental advice, and this is followed by a 20-page section on the scheme of

analysis, which depends on a preliminary separation by volatility, employing vacuum distillation. Final classification is by solubility tests and the use of the above-mentioned reagents. The remaining 50 pages deal with characterisation of the common functional groups and here experimental directions are given with literature references. There are also included useful notes on chromatographic separations on paper using simple equipment.

► Pattern of Chemistry

CHEMICAL PERIODICITY. By *R. T. Sanderson*. Reinhold, New York; Chapman and Hall, London, 1960. Pp. x + 330. 94s.

In his preface, Sanderson deplores the degeneration of chemists into specialists forced by the overwhelming bulk of information to concentrate on steadily decreasing areas of the subject. Inorganic chemists are particularly susceptible to these ills. This textbook is a determined attempt to present an overall picture in which regularities and patterns are emphasised. Special attention is given to the concept of electronegativity. As the book is printed in two columns on large quarto pages, much information is summarised. Nevertheless the author has found it necessary to confine himself largely to binary compounds of the non-metals, though there is also a chapter on metallic alkyls. The chapters end with 'questions for review', 'questions for further thought and discussion', and supplementary references. References are not given in this body of the text. The book should be suitable for honours students.

► EDTA in Analysis

ANALYTICAL APPLICATIONS OF DIAMINOETHANE-TETRA-ACETIC ACID (2ND EDN.). By *T. S. West* and *A. S. Sykes*. British Drug Houses, 1960. Pp. 127. 4s 6d.

A bibliography with over 520 references shows how the usefulness and importance of the acid EDTA has grown, especially for chemical analyses. The numerous indicators used in EDTA titrations together with accounts and comments on their applicability and limitations, and physical methods of end-point detection are surveyed and followed by an account of masking and demasking agents. The determination of metals from aluminium to zirconium, of a number of anions, the hardness of water, EDTA in the analysis of technical materials and as an interference suppressor are described briefly but clearly. Other 'complexones' are mentioned and compared with EDTA. Twelve new sections form an appendix of topics such as more recent indicators and physico-chemical end-point methods, and the use of amalgams. This booklet is intended as an introduction for analysts and for students at graduate and A.R.I.C. level. However, it is best described as a review that has been enhanced by an appendix. One could hardly expect a detailed practical book at this price.

SCIENTIFIC RUSSIAN WITHOUT TEARS

Part 7—Where Do We Go From Here ?

By Professor W. J. Perry

(University of Arizona, Tucson, Arizona, U.S.)

THE patient and persistent soul who has come as far as this part presumably must have had some ultimate goal in mind—either that of following the current developments in his own field of science as reported in the extensive Russian literature, or perhaps that of continuing the study of the language itself. The following notes and comments are offered as suggestions for further study.

'Scientific Russian Without Tears' is based on a comprehensive text⁽¹⁾ which was written so that it could be used by beginners who know no Russian, or by advanced students as a reference book when clearing up uncertain points in grammar. A smaller companion volume⁽²⁾ summarises Russian chemical nomenclature and outlines the general grammatical structure of scientific Russian. A book by the author of these notes on the role of Russian roots in the derivation of Russian scientific and technical terms is in preparation.⁽³⁾

Another general textbook on scientific Russian has been recently published by John and Ludmilla Tuekevich⁽⁴⁾.

Several general Russian-English dictionaries are now available. Two of these may be recommended:

- (a) Segal, Louis
New complete Russian-English dictionary
3rd edn., pp. 1016, London, 1946.
- (b) Smirnitski: A. I.
Russko-angliiskii slovar'
50,000 words, 3rd edn., pp. 951, Moscow, 1958.

Readers with a fair knowledge of the language may refer to the following Russian dictionaries:

- (c) Ushakov, D. N.
Tolkovy slovar' russkogo yasyka
(Dictionary of the Russian language)
80,000 words, 4 vol., pp. 2800, Moscow, 1940.
- (d) Stepanov, Ya. A.
Kratkii politekhnicheskii slovar'
(concise definition of scientific terms, illustrated
by drawings and graphs)
pp. 1132, Moscow, 1956.

A large number of dictionaries devoted to special fields have been published in the U.S.S.R., though most of them exist only in the English-Russian version and are often little more than word-lists.

The Consultants Bureau Inc., 227 West 17th Street, New York, publish Russian-English word glossaries, and also several complete dictionaries devoted to special fields.

A good dictionary of chemical terms has appeared in the U.S.A.:

- (e) Ludmilla I. Callaham
Russian-English technical and chemical
dictionary.
5th Printing, New York, 1958.

In this country, the Department of Scientific and Industrial Research has recently initiated a very comprehensive translating programme of Russian papers. Requests for translation should be addressed to their Lending Library Unit, 20 Chester Terrace, London, N.W.1. The papers should, in general, not be more than a year old, and the customer may be asked to edit the English version.

The Lending Library Unit has a large collection of translations of Russian papers from various sources and a comprehensive library of Russian books and periodicals covering many fields.

H.M.S.O. publishes a monthly pamphlet 'Translated Contents List of Russian Periodicals', covering recent accessions to the collection of the Lending Library Unit of the D.S.I.R.

Besides, the Lending Library Unit undertakes cover-to-cover translation of a number of Russian journals. The following chemical journals are listed as available in translation from January 1960:

- (a) Kauchuk i resina (Soviet Rubber Technology)
- (b) Koks i Khimia (Coke and Chemistry)
- (c) Uspekhi Khimii (Russian Chemical Reviews)
- (d) Zhurnal fizicheskoi, Khimii
(Russian Journal of Physical Chemistry)
- (e) Zhurnal neorganicheskoi Khimii
(Russian Journal of Inorganic Chemistry).

REFERENCES

- (1) J. W. Perry, *Scientific Russian, A Textbook for Classes and Self Study* (2nd edn.) (New York and London: Interscience Publishers, 1960).
- (2) J. W. Perry, *Chemical Russian, Self-Taught* (Easton, Pa.: Mack Printing Co., 1948).
- (3) J. W. Perry and George P. Syvenko, *Russian Scientific Terms—Their Meaning and Structure* (New York and London: Interscience Publishers, in preparation).
- (4) John and Ludmilla Tuekevich, *Russian for the Scientist* (Van Nostrand, New York, 1959).

[This completes our serialisation of 'Scientific Russian Without Tears,' which first appeared under the imprint of the American Chemical Society. Part 1 was published in CHEMICAL AGE, 24 September, p. 489.]

Penicillin Demand Keeps Glaxo Ulverston Plant at Full Capacity



Symbolising the round-the-clock operation of antibiotics factories to keep pace with the present high demand for penicillin, which is likely to top the £4 million mark this year, is this night view (left) of the solvent recovery unit at the Ulverston, N.W. Lancs, factory of Glaxo Laboratories Ltd. On the right is a battery of deep-fermentation tanks at Ulverston, each capable of holding 10,000 gall. of penicillin broth. Ulverston is Glaxo's major penicillin and streptomycin unit

New Effluent Treatment Process Under Test by Mersey River Board

CHIEF chemist and the senior pollution inspector of the Mersey River Board have examined a new process for the treatment of trade wastes and sewage that was discovered by a director of a firm of effluent treatment specialists. The results seem to warrant more research particularly on the various intractable wastes (e.g. those of the textile industry) in the board's area.

As it might well be difficult for the small company concerned, situate in another part of the country, to carry out such day to day research or to have the

entree to premises of the various companies whose co-operation would be essential, and as in any case any results obtained by the company might on more than one ground be suspect, the board has at its Sale workshop built a portable pilot plant which can be carried by lorry for experiment at works in the area.

It is being made quite clear that the board is engaged on research and that there is no intention of pressing the use of a patent process. No charge is being made by the owner of the process, who

is collaborating in assessing the value of the results, and the experiment can only take place with the co-operation of the manufacturers concerned.

When the board's report for 1959-60 was being prepared the pilot plant was being operated at a works in the board's north-eastern area. The plant had only been working a short time but certain indications from trial runs were encouraging.

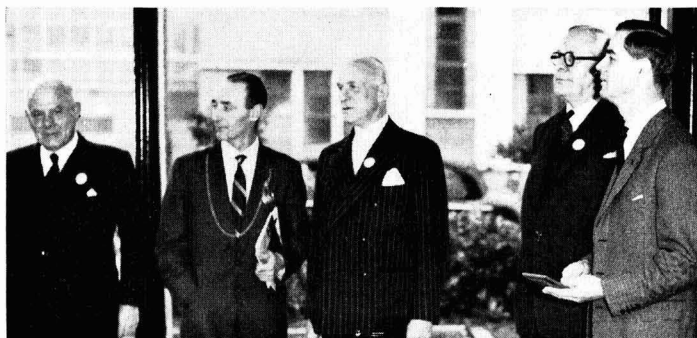
Overseas Division for D.C.L. Chemical Group

AN Overseas Division is to be set up by the Distillers Company Ltd. Chemical Group with responsibility for D.C.L.'s overseas chemical interests. Dr. H. K. Whalley, formerly Chemical Division director in charge of development, will head the new division and will be aided by Mr. P. L. Bramwyche.

In Australia, D.C.L. have a 40% interest in C.S.R. Chemicals (Pty) Ltd., Sydney, who are owned in partnership with Colonial Sugar Refining Co. Ltd. C.S.R. Chemicals make organic chemicals and plastics, mainly based on local raw material sources.

In South Africa, D.C.L. have an interest of just under 50% in National Chemical Products Ltd., Germiston, who also make organic chemicals and plastics in an increasing range.

Anderson Paisley Laboratories Opened



At the opening of the new Paisley laboratories of James Anderson and Co. (Colours) Ltd. were, l. to r., C. A. Staehelin, director, J. R. Geigy S.A. and director, Geigy (Holdings) Ltd.; Baillie J. MacWalters, Paisley's senior magistrate; A. H. Whitaker, chairman, James Anderson and Co.; E. G. Turner, chairman, Geigy (Holdings); and Lord Polwarth (see C.A., 12 November, p. 824)

C.S. Periodicals Listed

A list of periodicals held in the library of the Chemical Society has been published by the Society, Burlington House, London W.1, price 5s, post free, and is intended as a reference guide for those who use the library and for the librarians of other institutions. The list has been arranged alphabetically by the title as it appears on the title page of the journal.

● Industrial and Commercial Finance Corporation Ltd. have acquired an interest in Yarsley Research Laboratories Ltd. and have nominated **Mr. W. Toft** to the board. **Mr. W. Flavell** and **Mr. G. C. Ives** have also been appointed directors and the composition of the board is now as follows: **Dr. V. E. Yarsley, M.Sc., D.Sc.(Tech.), F.R.I.C., F.P.I., M.I.Chem.E.**, chairman and managing director; **Dr C. Webber, M.A. (Oxon.), Ph.D.(Lond.), A.M.I.Chem.E.**, vice chairman; **Mr. W. Flavell, B.Sc., A.R.I.C.**; **Mr. G. C. Ives, B.Sc., A.R.I.C., F.P.I.**; and **Mr. W. Toft**. Yarsley Testing Laboratories Ltd. becomes a wholly owned subsidiary of the parent company. **Mr. L. W. Turner, B.Sc., A.R.I.C., A.P.I.**, joins the board, the existing members of which are **Dr. Yarsley** (chairman), **Dr. Webber** (vice chairman) and **Mr. Ives** (managing director).

● **Mr. J. S. Watkins**, head of the fertiliser sales control department of I.C.I. Billingham Division, has been appointed a director of Scottish Agricultural Industries Ltd., an I.C.I. subsidiary.

● **Comdr. A. T. Bond, R.N. (Rtd.)**, has been appointed director of sales for P. Leiner and Sons (Wales) Ltd., ossein gelatine producers. He joined the company 12 years ago and has been sales manager since 1958.

● **Mr. P. T. Stephens**, while remaining joint managing director with **Mr. A. L. Trump**, has been appointed deputy chairman of Saunders Valve Co. Ltd. **Mr. P. C. E. Rose**, an executive director, has been appointed general manager of the company's industrial divisions.



Professor J. M. Robertson, F.R.S., Gardiner Professor of Chemistry, Glasgow University, who has been awarded the Royal Society's Davy Medal (C.A., 12 November, p. 827)

● **Mr. P. B. H. Brown, M.I.Mech.E.**, has been appointed chairman of Worthington-Simpson Ltd., the Newark firm of engineers, following the retirement of **Sir Samuel R. Beale, K.B.E., M.I.Mech.E.**

● **Mr. A. J. M. Henshaw, M.A.**, has been appointed assistant managing director of W. C. Holmes and Co. Before this appointment he was a director and general sales manager. **Mr. B. J. Duncan**, hitherto field sales manager, becomes sales manager.

Mr. William Collison, chairman of William Blythe and Co. Ltd., of Holland Banks Works, Church, Accrington, completed 75 years' service with the com-

PEOPLE in the news

pany on 15 November. On that date he was guest of honour at a small informal luncheon at which his closest friends in the chemical industry were present. **Mr. G. K. Hampshire**, a director of I.C.I., took the chair and presented Mr. Collison with a silver coffee set to commemorate the occasion. Mr. Collison joined the company in 1885, at the age of 13, as an office boy, and was appointed managing director in 1919. He succeeded the late **Mr. F. E. F. Blythe** as chairman in 1957.



John S. Young, director of Craig Pumps Ltd., whose recent visit to Moscow, which led to a large order, is referred to in 'Distillates', p. 858

● **Dr. M. B. Geiger** has been appointed director of international development of Hooker Chemical Corporation, U.S. The new post demonstrates Hooker's intensified interest in business opportunities abroad in its long-range plans for expansion and diversification in chemicals and plastics.

Whesoe Get French Manufacturing Rights

An extension to the agreement between Whesoe of Darlington and the Shand and Jurs Co. of California has just been concluded. The extended agreement gives Whesoe the exclusive rights to manufacture J and R tanks in France and to sell them within the common market and the French Union.

A new French subsidiary is being formed, Whesoe S.A., and land has already been obtained at Calais for a manufacturing and assembly plant. Production will start in the summer of next year.

Whesoe originally obtained a licence for S and J fittings in 1948 but has up to now manufactured only in the U.K. Since then Whesoe has secured increasing business for S and J fittings in all major Western European countries and elsewhere overseas.

Combined Rubber and Plastics Research

A new combined research association of the rubber and plastics industries, to be known as the Rubber and Plastics Research Association of Great Britain, is to be formed. An extra-ordinary general meeting of the executive committee of the Research Association of British Rubber Manufacturers was held in London on Tuesday to adopt the articles of the new association, and about a third of the membership of the British Plastics Federation have decided to support the new venture.

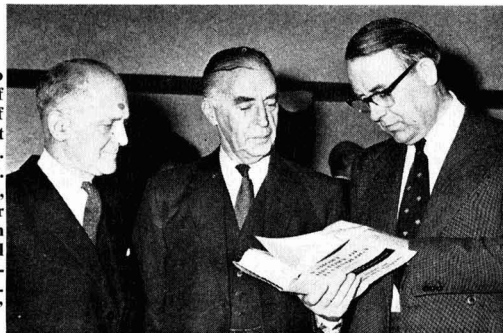
Research will be carried out at the existing laboratories of the rubber industry at Shawbury, where work has already begun on new buildings to house the additional personnel and equipment for plastics research.

I.C.I. Ammonia Works Safety Record

For the second time the I.C.I. Billingham Division Ammonia Works have achieved one million hours' accident-free working.

Reception to Mark 'History of Technology'

At a reception to mark publication of 'A Short History of Technology', the joint authors, **Dr. T. K. Derry** (left) and **Dr. T. I. Williams** (right), talk to **Sir Walter Worboys** who, when I.C.I. commercial director, actively encouraged the 'History of Technology' venture



Commercial News

A. B. Fleming

Interim dividend of A. B. Fleming (Holdings) Ltd. for the year ending 31 March, 1961, is 5% (same). Sales and profits of the operating companies for the first half of the year are both said to be satisfactory.

Beecham Group

Group trading profit of the Beecham Group Ltd. for the half-year ended 30 September, was £4,374,000 (£4,152,000 for the same period of 1959 and £3,691,000 for the six months ending 31 March last). Net profit was £2,201,000, compared with £2,018,000 a year ago and £1,788,000 for the half year to 31 March 1960. Half-year sales by the group totalled £26,988,000, an increase of £2,463,000 over the same period of 1959 and £1,554,000 up on the six months ended 31 March 1960. A first interim of 8% (same) has been declared and subject to unforeseen circumstances a similar second interim will be declared for payment on 1 April next. In future years it is proposed to declare only one interim, in mid-November, and a single interim of 16% is forecast for the year ending 31 March 1961.

William Butler

Interim dividend of William Butler and Co. (Bristol) Ltd. for 1960 is 4% (2%). Group trading results for the half-year ended 30 June showed an improvement over the same period of 1959. The indications are that the full year results will show a similar improvement.

Evans Medical Ltd.

Evans Medical Ltd. have declared an interim dividend for the year ending 31 December 1960 of 3d per 5s Ordinary Stock Unit, payable on 31 December 1960, less income tax.

Powell Duffryn

Turnover and profit of Powell Duffryn Carbon Products on the manufacture of heat exchangers and other chemical equipment in graphite have improved considerably in the last year and, despite keen competition, the forward order position is satisfactory, says the chairman of Powell Duffryn Ltd., Sir Henry Wilson Smith, in his annual statement.

Unilever

Interim dividend of Unilever Ltd. for 1960 is 1s 9.7d (1s 7.2d) per £. Unilever N.V. interim is Fl.8 (Fl.7) per Fl.100 share.

Reeve Angel

Stock exchange dealings began this week in the £270,076 ordinary 5s shares of Reeve Angel International, parent company of a group of agents and merchants of a wide range of coated, filter and technical papers. The group is sole world selling agent, outside North

- Beecham Half-year Sales Up £2.46 Million
- Butler Raise Interim on Better Results
- P.D. Carbon Report Higher Profits, Sales
- Expansion Issue by Australian Chemical

America, for the products of W. and R. Balston and holds sole merchandising rights in the U.S., Canada and Mexico. For 1960, the directors expect profits to exceed the 1959 level of £100,000.

Simon Engineering Ltd.

Simon Engineering Ltd. have declared an interim dividend on the 15,021,102 Ordinary shares of 5s each at the rate of 10%, less income tax, in respect of the year ending 31 December 1960, and a dividend on the 922,407 6% Cumulative Preference shares of £1 each at the rate of 6% per annum, less income tax, in respect of the half year ending 31 December 1960. Both these dividends will be paid on 1 January 1961.

Australian Chemical Holdings

Australian Chemical Holdings Ltd., formerly Reichhold Chemical are making an issue of £580,000 in 7% convertible £1 notes in the proportion of one for eight to shareholders and noteholders registered on November 21. Staff provident fund will take up £35,000. Funds are required to assist in expansion of the manufacturing programme and for the company's share in the new venture, Hercules Powder Co. (Aust.) Pty. Ltd.

Office de l'Azote

The French State-owned nitrogen producers, Office National Industrial de l'Azote, of Toulouse, have announced a turnover of 160,000,000 New Francs for the 1959 financial year, 6% above that

for the previous period, although net profit for the year did not exceed 110,000 New Francs. The company, which during the year raised its capital from 30,000,000 to 50,000,000 New Francs, holds 50% of the French heavy water producer Compagnie Française de l'Eau Lourde, 28% of the Chemicals-from natural gas concern Aquitaine-Chimie and 50% of the new nitrogenous fertiliser producer Azolacq, Société Chimique d'Engrais et de Produits de Synthèse du Sud-Ouest.

Dow Chemical Co.

The Dow Chemical Co. announce sales of \$202,100,000 (\$191,700,00) for the first quarter of the 1960-61 financial year. Despite a fall in tax reserve transfer from \$20,500,000 to \$13,700,000 over the year, net profits dropped from \$22,320,000 to \$18,520,000. This represents a share profit of 69 cents (84 cents).

INCREASE OF CAPITAL

ANCHOR CHEMICAL COMPANY LTD., Clayton Lane, Clayton, Manchester 11. Increased by £150,000 beyond the registered capital of £375,000.

CHAS. LOWE AND CO. (MANCHESTER) LTD., Phoenix Chemical Works, Harrogate Road, Reddish, Stockport, Ches. Increased by £120,000 beyond the registered capital of £80,000.

J. M. STEEL AND CO. LTD., chemical merchants and manufacturers, etc., Kern House, 36/38 Kingsway. W.C.2. Increased by £140,000 beyond the registered capital of £110,000.

Market Reports

COPPER SULPHATE RISES 30s PER TON

LONDON There has been no decided trend in the industrial chemicals market, but in most sections a steady demand has been maintained, and a fair amount of new forward bookings has been placed.

Sulphate of copper is 30s per ton dearer as from 14 November at £76 10s per ton, less 2% f.o.b. Liverpool. Elsewhere, prices are unchanged and steady.

Buying interest in fertilisers has been only moderate, while in the coal tar products market business has been brisk with tar acids in good request. Naphthalene supplies are scarce relative to demand.

MANCHESTER Trade in the general run of chemical production in the past week has continued on reasonably steady lines. The textile and allied industries in the Lancashire area are calling for reasonably good contract deliveries of

bleaching materials and other chemicals, and there is a steady movement to most of the other industrial outlets, while the demand on overseas accounts has been maintained at around recent levels. Quotations are held pretty well throughout the range, with copper sulphate a shade dearer on balance at £76 10s/ton, less 2% f.o.b. Liverpool.

SCOTLAND The volume of business has again been fairly well maintained. Buying has been steady in regard to both spot and contract requirements. Inquiries have been quite numerous and varied, particularly those pertaining to contract requirements for the coming year. There has again been some variation in prices, but on the whole the tendency has been to firmness.

The overseas market has shown little change, while seasonal quietness is still apparent in regard to agricultural chemicals.

TRADE NOTES

Monsanto Polythene Film

Technical Service Bulletin No. M4/1, dealing with electrical discharge surface treatment of polythene film, has been published by Monsanto Chemicals Ltd., Monsanto House, Victoria Street, London S.W.1. The report represents an initial study of the main variables relating to the electrical discharge method for rendering polythene films receptive to printing inks and adhesives, and the important effects slip additives. It is hoped that various aspects of the method will be discussed in further publications.

Dry Cleaning Aid

A dry cleaning aid consisting of a blend of detergents specially designed for use in charge systems is produced by Laporte Industries Ltd. Known as Renklens, the compound can also be used in batch cleaning and can be employed in plants operating with perchlorethylene, trichlorethylene and white spirit. Renklens is a concentrated product having a total active content of 67%. The recommended concentration is 1½% and it is claimed that this gives good soil removal and considerably reduces the need for spotting. In addition to the anionic and noionic ingredients, Renklens contains corrosion inhibitors to protect the metals commonly found in dry cleaning machines.

Further information and technical advice can be obtained from Laporte Chemicals Ltd., P.O. Box 8, Luton, Beds.

Isokote Corrosion Protection

A new development in corrosion protection has been introduced by Extrudex Ltd., Highams Park, London E.4. Isokote bonded surface coatings are based on isophthalic polyesters and specially woven fabric reinforcements of glass, Terylene or other suitable fibres. The coatings are applied in successive layers by spraying and other methods, until the required thickness is built up. Among the applications is the patching of leaking tanks and linings for corroded or new vessels which arrest and prevent chemical attack.

Q.V.F. Spanish Agent

Afora S L, Aribau 240, Barcelona (11), have been appointed Spanish agents for the full range of glass pipeline and chemical plant manufactured by Q.V.F. Ltd., Duke Street, Fenton, Stoke-on-Trent.

Research Services

Research services in the fields of electrical materials and components, chemistry, physics and electronics are offered by G. V. Planer Ltd., Windmill Road, Sunbury-on-Thames, Middlesex, independent laboratories for research, development and experimental production.

The company undertakes projects of a long- or short-term nature on contract basis under conditions of assured security for industry. Government establishments and official institutions. Proposals are submitted free of charge and without obligation.

A technical information department also exists to provide comprehensive technical information services on current developments in physics, chemistry, electronics and engineering in Europe and North America. Patent and literature surveys, market surveys, reports on trade exhibitions, lectures, conventions, etc., are undertaken under continuous service agreement or on a single item basis.

G. H. Osborn Industrial Division

A new division has been set up within G. H. Osborn Building Products Ltd., for the manufacture of industrial reinforced plastics products. The Industrial Division, situated at Hayes, Middlesex, will act as a separate unit.

The division is capable of handling any application from its inception to post-production service. In addition a technical service department has been initiated to give qualified advice to customers.

New Secondary Acetate Dye

Alliance Dye and Chemical Co. Ltd., sole agents in U.K. for Compagnie Française des Matières Colorantes, have introduced a new dye, Acetoquinone Light Blue Bliz. It is claimed that the new dye for secondary acetate has outstanding fastness to gas-fumes, even in pale shades. The dyes are resistant to acid and have good fastness to light and to wet treatments generally. The dye is also recommended for use on triacetate, particularly by carrier techniques.

Fischer and Porter Catalogue

A new catalogue has been published by Fischer and Porter Ltd., Salterbeck Trading Estate, Workington, Cumberland, covering their range of flowmetering transmitters and secondary indicators, recorder, controllers and integrators.

Pneumatic, electric and electronic transmitters for use with variable-area flowmeters are described together with the new Fischer and Porter differential pressure transmitter for variable-head flowmetering applications. The complete

range of pneumatic, electric and electronic secondary receiving instruments are also shown.

Midsil Price Cut

Midland Silicones Ltd, 68 Knightsbridge, London S.W.1, have cut by 5s per lb, the price of DP 2403 self-adhering silicone rubber, only three months after reductions of up to 10% were announced for 15 other grades of silicone rubber. The cut in the price of DP 2403 from 36s to 31s per lb. (for 500 lb. lots) reflects Midland Silicones' conviction that the market for this grade of silicone rubber can and will grow considerably in the near future.

K. and K. Laboratories

The catalogue of K. and K. Laboratories Inc., 177-10 93 Avenue, Jamaica 33, New York, U.S., which lists more than 12,000 rare and fine organics is No. 3 and not priced at '\$3' as stated last week, p. 802. Copies are freely available from the company.

Gradiation Heaters

Whessoe Ltd., Darlington, have been appointed licensees of the Selas Corporation of America for the manufacture and supply of their Gradiation heaters. These are designed for heating petroleum fractions for such processes as primary and vacuum distillation, thermal cracking and reforming and the production of petroleum chemicals.

The furnace is a box type of integral construction including main frame, access platforms and ladders, burner and coil handling equipment and includes self supporting chimneys. It is fired by a large number of gas-air Duradant burners of comparatively small capacity located in two parallel walls of the furnace. The arrangement of these burners is flexible and designs can be varied to suit the heating duty required. The fluid to be heated passes through a horizontal pipe coil which is heated by radiation from both sides with uniform intensity. It is claimed that high heating rates to be used without damage of coking or tube failure.

Import Duty Lifted on Anhydrous Borax and Flake Graphite

IMPORT duty on certain anhydrous borax and flake graphite is removed by the Import Duties (General) (No. 11) Order, 1960 (S.I. 1960, No. 1970), which has been made by the Treasury on the recommendation of the Board of Trade.

Announcement of the new order came soon after a question in the House of Commons about applications for the abolition or reduction of duty on imported borax, reported in C.A., 5 November, p. 784. The Board of Trade had announced in January that applications were under consideration. The Board have now reached the conclusion that duty should be lifted only from certain anhydrous borax. This is defined as "di-Sodium tetraborate, such that, re-

duced to the dry anhydrous form, it would be of a purity not less than 99%: anhydrous". The import duty on certain hydrated borax remains at 20%.

As regards flake graphite, the order is intended to restrict the removal of the duty to flake graphite used in the production of crucibles for metal smelting. The full definition is: "natural graphite, crystalline, in flakes and containing not less than 85% of carbon, being graphite such that if a cylindrical container with an i.d. of 2 in. and a depth of 1-15/16 in. is filled by funnelling the graphite through a circular orifice of ½ in. dia. placed centrally 2½ in. above the top of the container, the contents of the container will have a density of less than 60 g. per 100 c.c."

NEW PATENTS

By permission of the Controller, H.M. Stationery Office, the following extracts are reproduced from the 'Official Journal (Patents)', which is available from the Patent Office (Sales Branch), 25 Southampton Buildings, Chancery Lane, London W.C.2, price 3s 6d including postage; annual subscription £8 2s.

Specifications filed in connection with the acceptances in the following list will be open to public inspection on the dates shown. Opposition to the grant of a patent on any of the applications listed may be lodged by filing patents form 12 at any time within the prescribed period.

AMENDED SPECIFICATIONS

Open to public inspection 21 December

Synthetic detergent compositions. Colgate-Palmolive-Pet Co. 720 195
Reduction of aminoketones. Carnegies of Welwyn Ltd. 747 768

ACCEPTANCES

Open to public inspection 29 December

Process for the production of condensation products of formaldehyde with urea. Tootal Broadhurst Lee Co. Ltd. 857 283
Purification of pyrethrum extracts and the production of synergised pyrethrin compositions. Cooper, McDougall & Robertson Ltd. 857 541
Trifluoromethyl-phenothiazine derivatives. Olin Mathieson Chemical Corporation. 857 546
Epoxy resin compositions. Minnesota Mining & Manufacturing Co. 857 073
Chromium complexes of fluorocarbon acids and articles coated therewith. Minnesota Mining & Manufacturing Co. 857 073
Chromium complexes of fluorocarbon acids and articles coated therewith. Minnesota Mining & Manufacturing Co. 857 334
Fluorocarbon acids and derivatives. Minnesota Mining & Manufacturing Co. 857 335
Fluorocarbon vinyl-type esters and polymers. Minnesota Mining & Manufacturing Co. 857 336
Hydrocarbon fuels for internal-combustion engines. Drouven, E. 857 142
Production of emulsion polymers and aqueous media therefor. Berger & Sons Ltd., L. 857 514
Process for the production of *p*-nitrobenzaldehyde. Licencia Talalmanyokot Ertekesito Vallalat. 857 549
Polymerisation of hydrocarbons. Olin Mathieson Chemical Corporation. 857 143
Block copolymers. Distillers Co. Ltd. 857 145
Process for the manufacture of a polyurethane plastic material. Klockner-Georgsmarienwerke AG. 857 078
Polyvinyl alcohols of high solution viscosity and process for their manufacture. Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius, & Brüning. 857 147
Sulphonyl-urethanes and process for their manufacture. Farbwerke Hoechst Aktiengesellschaft Vorm. Meister, Lucius & Brüning. 857 148
Preparation of derivatives of unsaturated terpenic hydrocarbons. Glidden Co. 857 455
Cyclopentanophenanthrene derivatives and process for the production thereof. Syntex S.A. 857 080, 857 081
Pharmaceutical compositions. Chemische Fabrik Promonta, GmbH. 857 243
Organo-silicon condensation products. Imperial Chemical Industries Ltd. 857 153
Process for the manufacture of basically substituted 3-alkyl-phenothiazines. Farbenfabriken Bayer AG. 857 418
Process for the manufacture of carbon tetrachloride. Farbwerke Hoechst Aktiengesellschaft, Vorm. Meister, Lucius, & Brüning. 857 086
Process for the manufacture of vinyl chloride. Farbwerke Hoechst Aktiengesellschaft, Vorm. Meister, Lucius, & Brüning. 857 087
Resinous compositions. Minnesota Mining & Manufacturing Co. 857 088
Production of alumina. Anaconda Co. 857 245
Method of producing highly condensed melamine-formaldehyde resins. Sueddeutsche Kalkstickstoffwerke AG. 857 155
Production of hydrazones of hetero-cyclic ketones. Badische Anilin- & Soda-Fabrik AG. 857 198

Alkylphenoxypolyethoxyalkanois and method of preparation thereof. Rohm & Haas Co. 857 156
Waterproofing and plasticising compounds for cement, concrete and the like. Fisher, G. 857 092
Processes for production of low permeability carbon. General Electric Co. Ltd. 857 157
Compounding material for rubber and rubber substitutes. La Crosse, C. G. 857 494
Substituted acridans. Smith Kline & French Laboratories. 857 159
Treatment of organopolysiloxanes. Imperial Chemical Industries Ltd. 857 343
Process for the preparation of tridecane-1,13-dicarboxylic acid or its ester, suitable for the preparation of exaltone (cyclopentadecanone). Council of Scientific & Industrial Research. 857 163
Benzyl dithiocarbamates and their use in bacteriostatic products. Monsanto Canada Ltd. 857 097
Lubricating greases. British Petroleum Co. Ltd., Pethrick, S. R., and Groszek, A. 857 165
Oxidation of alkyl substituted aromatic compounds. Imperial Chemical Industries Ltd. 857 098
Copolymers of ethylene and tricyclic olefins. Du Pont de Nemours & Co., E. I. 857 099
Triazine derivatives, their preparation and compositions containing them. Shell Research Ltd. 857 166
Catalytic reforming of hydrocarbons. British Petroleum Co. Ltd., White, P. T., and Burbridge, B. W. 857 425
Process for the production of silicon and the elements of group 4A of the periodic system. Deutsche Gold- und Silber-Scheideanstalt Vorm. Roessler. 857 346
Substituted pyrrolidines. May & Baker. 857 426
Esters of cycloheximide and pesticidal compositions containing same. Upjohn Co. 857 167
Catalytic reforming of petroleum hydrocarbons. British Petroleum Co. Ltd., Porter, F. W. B., and White, P. T. 857 349
Process for the treatment of iron pyrites ores containing arsenic and lead. Instituto Nacional De Industria. 857 350
Dipyridyl derivatives. Imperial Chemical Industries Ltd. 857 501
Vulcanisation of synthetic rubber with polyhalomethyl phenol substances. Esso Research & Engineering Co. 857 428
Polymerisation. Union Carbide Corporation. 857 106
Halogenated polyalkylene oxides. Union Carbide Corporation. 857 107
Sulphur dyes and dyeing of textiles therewith. Whiffen & Sons Ltd. 857 429
Process for the production of polycarbonates. Farbenfabriken Bayer AG. 857 430
Recovery of sulphur values of acid sludge. Simon-Carves Ltd. 857 111
Manufacture of resorcinol. Distillers Co. Ltd. [Addition to 775 813.] 857 113
16-substituted steroid compounds. British Drug Houses Ltd. 857 114
Stabilised halogen-containing synthetic resins. Metal & Thermit Corporation. 857 358
Catalytic reforming of hydrocarbons. British Petroleum Co. Ltd., Bourne, K. H., and White, P. T. 857 504
Production of hardenable synthetic resin compositions. Henkel & Cie GmbH. 857 117
Polyamides. Union Carbide Corporation. 857 062
Production of hydrogen fluoride. Flemmert, G. L. 857 118
Urea-phosphoric acid cleaning composition. Drew & Co. Inc., E. F. 857 119
Benzene disulphonamides. British Drug Houses Ltd. 857 435
Dithio-anthracene derivatives and fungicidal compositions containing them. Merck AG, E. 857 383
Hydrazine salts of aryloxy aliphatic carboxylic acids and method of producing same. Imperial Chemical Industries of Australia & New Zealand Ltd., and Commonwealth Scientific & Industrial Research Organisation. 857 063
Refining synthetic resins. Monsanto Chemicals Ltd. 857 121
Polymers. Union Carbide Corporation. 857 122
Colour couplers containing long chain alkylaminoisophthalic-esters groups. General Aniline & Film Corporation. 857 213
Polyolefin blends and process for preparation thereof. Phillips Petroleum Co. 857 448

Preparation of persulphates. Food Machinery & Chemical Corporation. 857 385
Production of polystyrene of high impact strength. Chemische Werke Hüls AG. 857 125
Epoxidation. Union Carbide Corporation. 857 126
Azo dyestuffs and metal complexes thereof. Farbenfabriken Bayer AG. 857 386
Quinazoline derivatives. Imperial Chemical Industries Ltd. 857 362
Preparation of derivatives of unsaturated terpenic hydrocarbons. Glidden Co. [Divided out of 857 455.] 857 456
Method of making polyurethane elastomers. United States Rubber Co. 857 131
Tertiary amine salts of chlorinated carboxylic acids and their use as weed-killing and weed growth inhibiting agents. Badische Anilin- & Soda-Fabrik. 857 387
Process for the manufacture of isoprene or butadiene. Knapsack-Griesheim AG. 857 135
Catalysts for carbon monoxide conversion. Ube Kosan Kabushiki Kaisha. 857 136
Method of sweetening petroleum distillate. Esso Research & Engineering Co. 857 389
Cyclopentadienyl compounds of vanadium and their production. Badische Anilin- & Soda-Fabrik AG. 857 138
High molecular weight mercaptans. Pennsalt Chemicals Corporation. 857 139
Method and apparatus for production of carbon black. Phillips Petroleum Co. 857 256
Process for producing di-methylcyclopentadiene. Esso Research & Engineering Co. 857 257
Dyes containing keto groups and their production. Badische Anilin- & Soda-Fabrik AG. 857 391

DIARY DATES

MONDAY 21 NOVEMBER

C.S.—Cardiff: Chemistry Dept., Univ. Coll., Cathays Park, 5.30 p.m. 'Polyethers', by Prof. G. Gee.
C.S.—Oxford: Inorganic Chemistry Lecture Theatre, Univ., 8.15 p.m. 'Researches on some nitro-containing carbohydrates', by Prof. M. Stacey.

TUESDAY 22 NOVEMBER

C.S.—Dundee: Chemistry Dept., Queen's Coll., 5 p.m. 'Co-ordination chemistry of elements of the second and third group', by Prof. G. E. Coates.
C.S.—St. Andrews: Chemistry Dept., St. Salvator's Coll., 5.15 p.m. 'Anatomy of gustation', by Prof. J. Hawthorn.
I.Chem.E.—Manchester: Manchester Coll. of Science & Tech., Jackson St., 3.30 p.m. 'New developments in the bulk supply of chemical reagents', (Discussion).
S.A.C.—London: Burlington Hse., Piccadilly, W.1, 6.30 p.m. Physical Methods Group, a.g.m. followed by meeting on 'Atomic-absorption spectroscopy'.
S.C.I.—London: 14 Belgrave Sq., S.W.1, 6.30 p.m. 'A comparison between cationic and free radical polymerisation', by Dr. S. H. Plesch.

WEDNESDAY 23 NOVEMBER

I.Chem.E.—Cardiff: South Wales Institute of Engineers, 7.15 p.m. 'Work of the alkali inspectorate', by J. C. Peabody.
Plastics Inst.—Bath: Royal York Hotel, 7.30 p.m. 'Colours, their uses and developments', by H. G. White.
R.I.C.—London: S. W. Essex Coll. of Tech., Forest Rd., E.17, 6.30 p.m. 'Nucleic acids and heredity', by Prof. J. A. V. Butler.
S.A.C.—Newcastle: Chemistry Dept., King's Coll., 6.30 p.m. 'Changing aspects of chemical analyses', by H. N. Wilson.

THURSDAY 24 NOVEMBER

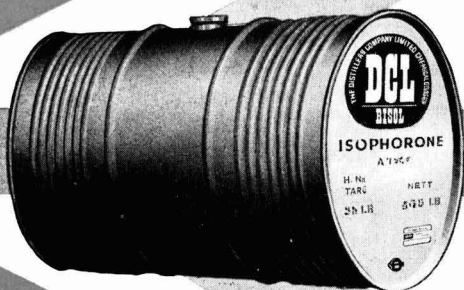
C.S.—Hull: Chemistry Dept., Univ., 5 p.m. 'Atomic reactions studied by spectroscopy', by Prof. R. G. W. Norrish.
C.S.—Liverpool: Dept. of Inorganic and Physical Chemistry, 5 p.m. 'Some newer aspects of the organic chemistry of sulphur', by Dr. L. Bateman.
Fertiliser Soc.—London: Burlington Hse., W.1, 2.30 p.m. 'Ten years' experience with heavy applications of nitrogen on grassland in the Netherlands', by H. Van Der Molen.
Inst. Packaging—London: Connaught Rooms, W.C.2, 'Two-day conference on 'Odour in packaging'.
S.C.I. with R.I.C.—Falkirk: Lea Park Rooms, 7.30 p.m. 'Tariffs and chemicals in W. Europe, retrospect and prospect', by G. Brearley.

FRIDAY 25 NOVEMBER

C.S.—Newcastle: Chemistry Dept., King's Coll., 5.30 p.m. Bedson Club Lecture, 'Actinomycin group of antibiotics', by Prof. A. W. Johnson.
R.I.C.—Chatham: Medway Coll. of Tech., Maidstone Rd., 7 p.m. 'Some observations on analytical chemistry', by Dr. J. Hadlam.
S.C.I.—Exeter: Univ., 5 p.m. 'Steroid hormones', by Dr. B. A. Hems.

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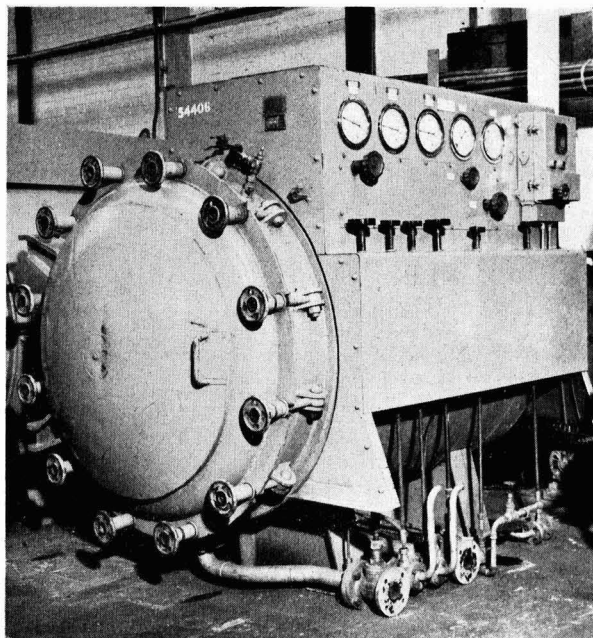
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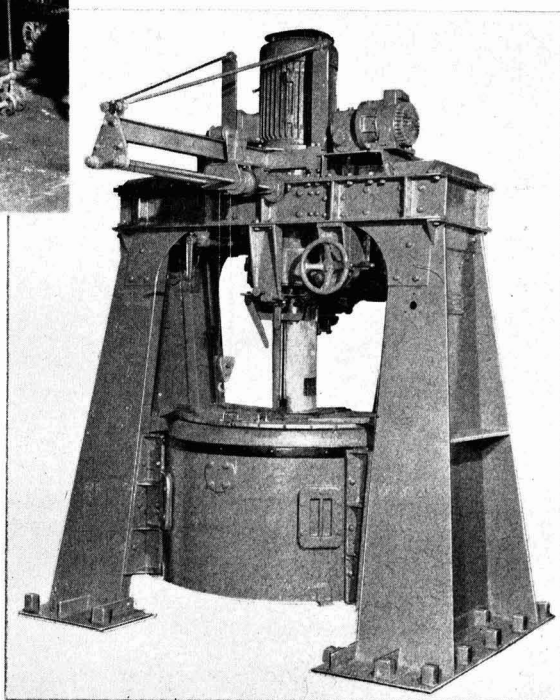
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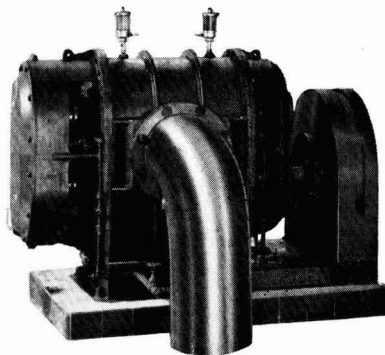
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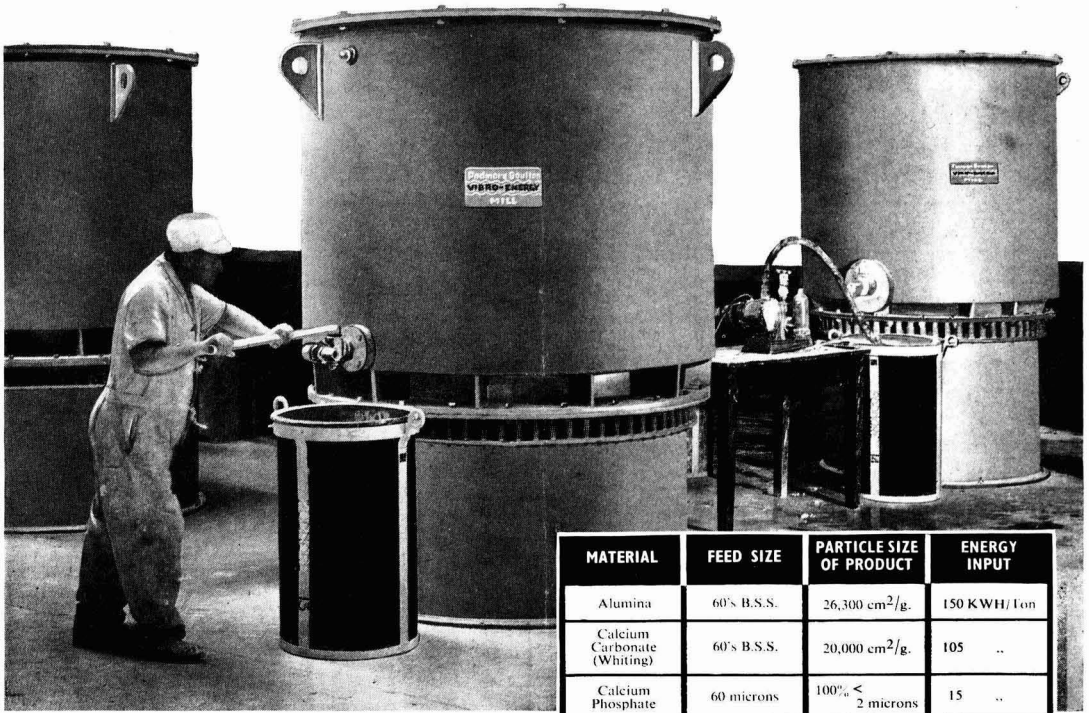
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